Pit and Quarry

With which is consolidated

CEMENT-MILL & QUARRY

November, 1935

APR 25 1936

RAYMOND BOWL MILL

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In direct firing a rotary lime kiln, the Bowl Mill replaced producer gas and increased the lime-to-coal ratio from less than 2:1 to more than 3:1—typical results that challenge all records of economy.

Equally efficient for pulverizing non-metallic minerals and manufactured products—operating in closed circuit with a Raymond Mechanical Air Separator.

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★ Pages 15-19

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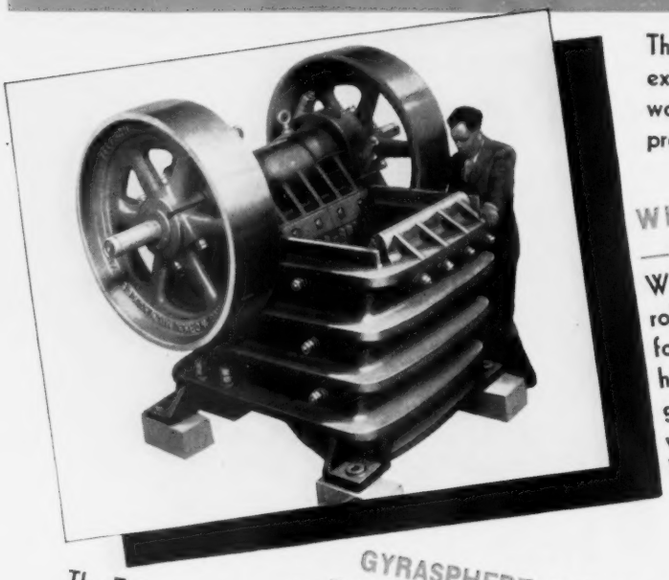
AND LOWER UP-KEEP



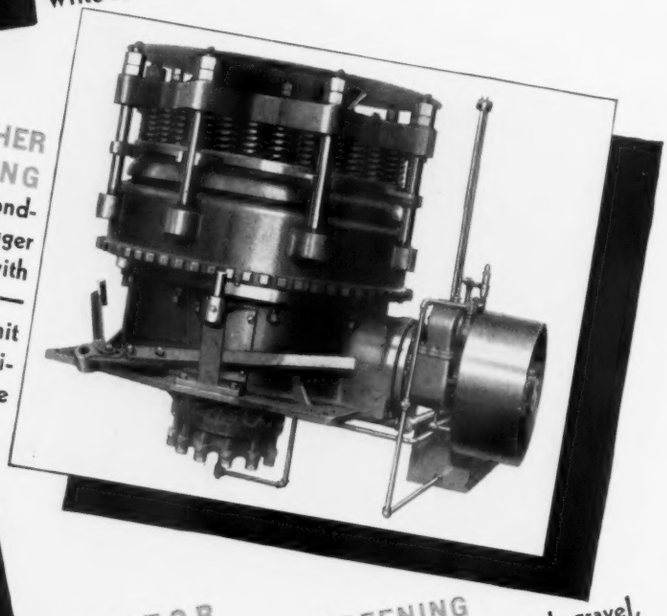
This 3-piece combination of Telsmith equipment is a striking example of group efficiency. Modern in every sense of the word . . . each piece is designed and built to better the product and cut operating costs.

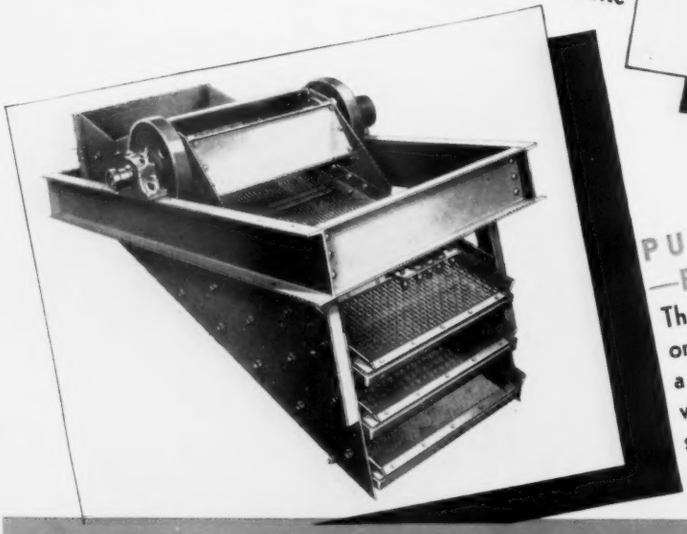
WHEELING JAW CRUSHER —FOR COARSE CRUSHING

With its compact, rugged steel structure and cylindrical roller bearings, the Telsmith-Wheeling Jaw Crusher is ideal for coarse crushing. The roller bearings, force feed and higher speed almost double the capacity without any greater expenditure for power. Simple adjustment allows wide sizing range. Up-keep is reduced to a minimum. Write for Bulletin W-15.

GYRASPHERE CRUSHER —FOR FINER CRUSHING

The Telsmith Gyrasphere takes the trouble out of secondary crushing. Working at choke feed, it turns out a bigger tonnage and more cubical product—crushes finer, with low power consumption and up-keep. The reasons—spring relief, rotary head support, spherical head, unit spring design, anti-friction thrust bearings, pressure lubrication, improved distribution of crusher pressures. Write for Bulletin Y-15.





PULSATOR —FOR EFFICIENT SCREENING

The Telsmith Pulsator screens crushed rock, sand, gravel, ore or coal . . . wet or dry. Its circular movement produces a maximum screening action, uniform on every inch of the wire, on every deck, under any load. The toughest alloy steels, the finest anti-friction bearings and special labyrinth and piston ring steels (to protect working parts) give longer life and lower up-keep. Write for Bulletin V-15.

MC-3

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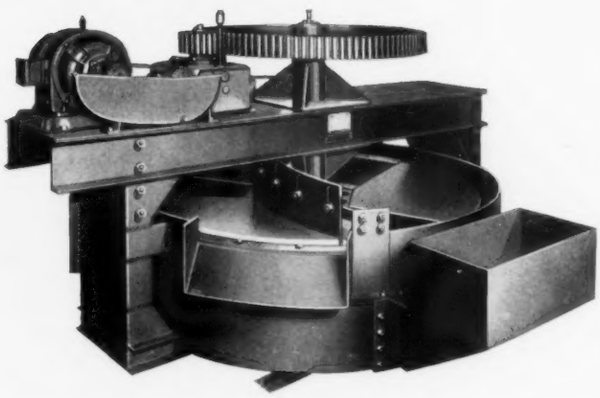
TELSMITH

Sand

THAT MEETS THE NEWER SPECIFICATIONS -- PRODUCED WITH THE

Rotoscoop



THE trend is towards cleaner, more uniform sand, of greater fineness—some specifications being written today, require from 10 to 25% of -50 mesh, and 2 to 15% of -100 mesh sand.

The Link-Belt Rotoscoop provides a simple method of recovering fine grains formerly lost in the overflow water —discharging dry enough for truck transportation.

The volume of fines and grading can be easily varied to suit requirements.

The Rotoscoop is a self-contained unit requiring low headroom, and minimum space and foundations; also little power. Can be fitted-in to take the overflow from present sand units, or to replace them. Send for Folder No. 1463.

5472

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The Leading Manufacturer
of Equipment for Handling Materials and Transmitting Power

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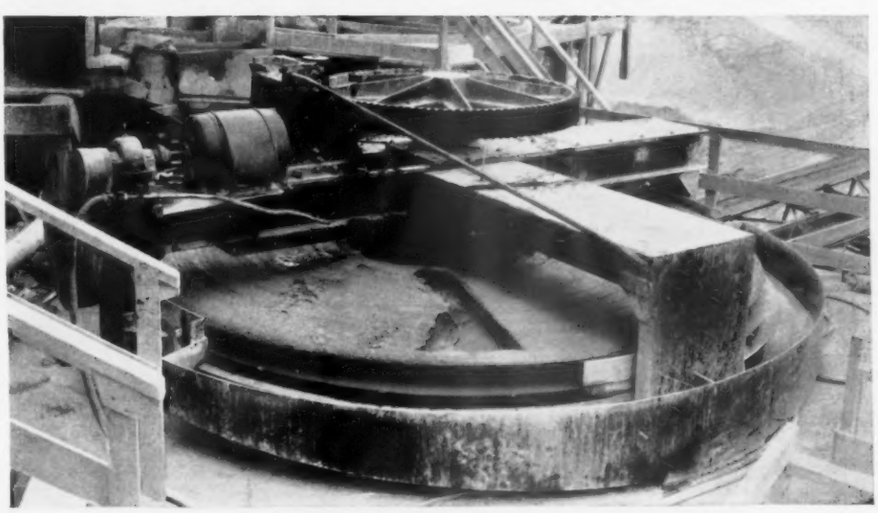
The Rotoscoop is made in four sizes: 15 ft., 12 ft., 9 ft., and 6 ft. diameters, with capacities ranging from 20 to 150 tons an hour, based on material weighing 100 lbs. per cu. ft.

Link-Belt makes a complete line of sand dewatering devices, including screw and log washers, conical separators, dewatering flight conveyors, and the Shaw classifier. Link-Belt engineers will be glad to look into your operating conditions and recommend the right unit for your work.

•

LINK-BELT



The illustration to the right is of a 15 ft. diam. Link-Belt Dewatering Rotoscoop handling crushed limestone sand at Norris Dam (T.V.A.), Norris, Tenn.

Another user has recently written, "We are proud of the Rotoscoop; our sand has been running 18% passing a -50 mesh screen—we figured the deposit would run from 12 to 15% passing."

APR -1 1936

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Pit and Quarry

With which is consolidated CEMENT-MILL & QUARRY

Volume 28 NOVEMBER, 1935 Number 5

MEMBER AUDIT BUREAU OF CIRCULATIONS

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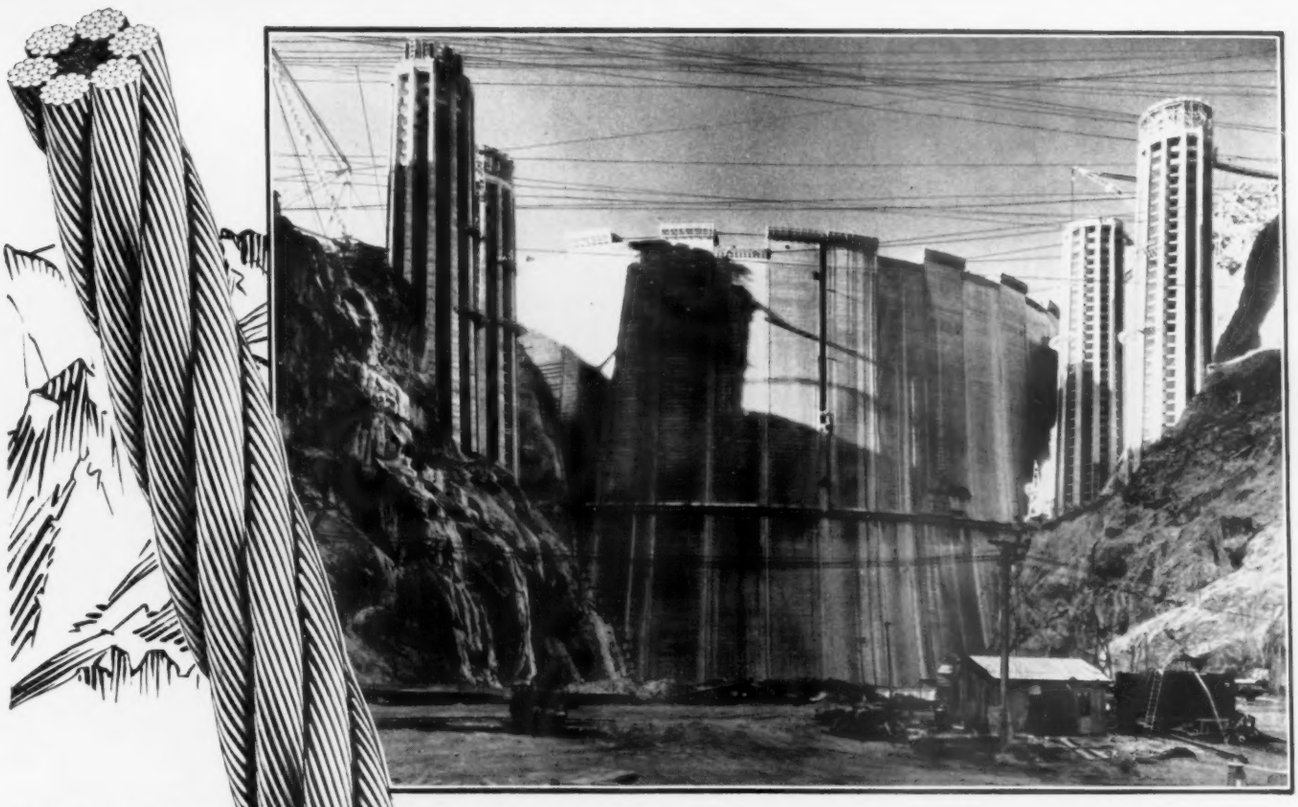

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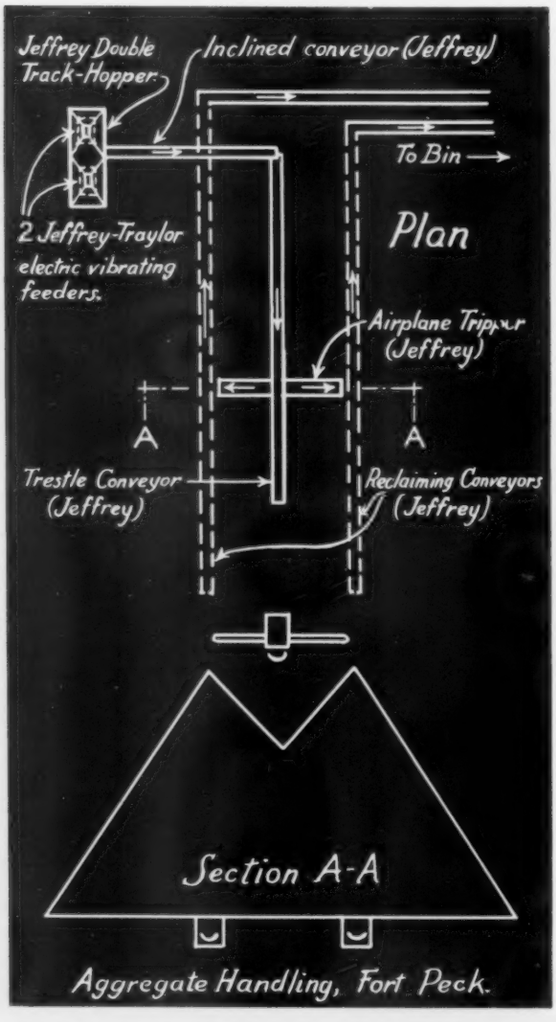
Aggregate and

The efficient and steady supply of materials at the Fort Peck Dam Project depends upon the successfully planned systems of aggregate and cement handling . . . designed and installed by Jeffrey Engineers.

The accompanying illustrations show the method of transferring the aggregate from the railroad through a Jeffrey double Track Hopper, discharging by Jeffrey-Traylor Electric Vibrating Feeders to a system of Jeffrey 30″ Belt Conveyors for stocking and reclaiming purposes.

Three hundred tons per hour handled by the Jeffrey aggregate handling system shown in the diagram below.



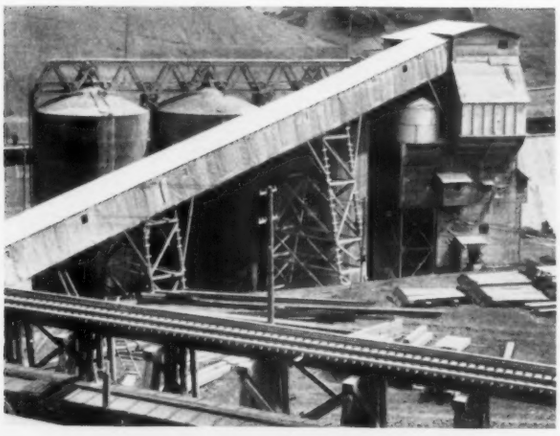
Right— Close-up of the Jeffrey Airplane Belt Conveyor Tripper. It piles material anywhere along the entire run of the conveyor.

Left—The aggregate storage at Fort Peck. This photo shows how the Jeffrey Belt Tripper distributes the sized material into piles on either side of the run.

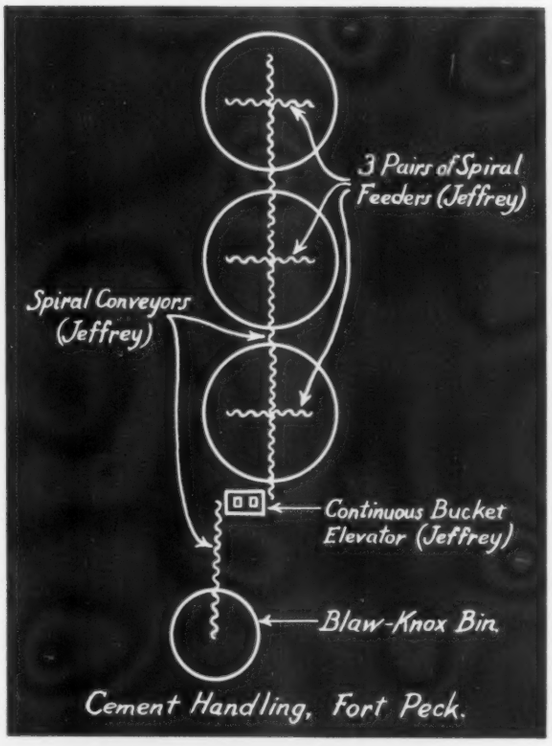
Right—The Jeffrey Inclined Belt Conveyor bringing material from the double Track Hopper.

AT FORT PECK

Cement Handling Systems



The Mixing Plant at Fort Peck. Note the Jeffrey Belt Conveyor, fully enclosed, used to convey the aggregate from the storage piles. The diagram below shows the Cement Handling lay-out at Fort Peck.



CEMENT SUPPLY

The cement handling system has a capacity of 50 tons per hour. The material, weighing 60 lbs. per cubic foot, is taken from each of the three bins (see view above) by Jeffrey Spiral Feeders . . . then to a long Jeffrey Spiral Conveyor to a Jeffrey Continuous Bucket Elevator . . . thence to another Jeffrey Spiral Conveyor supplying the concrete mix plant.

The high efficiency of this plant demonstrates the importance of installing dependable equipment that gives trouble-free operation . . . that is unfailing in its steady supply of material. Jeffrey Material Handling Equipment is a positive guarantee of the best results.

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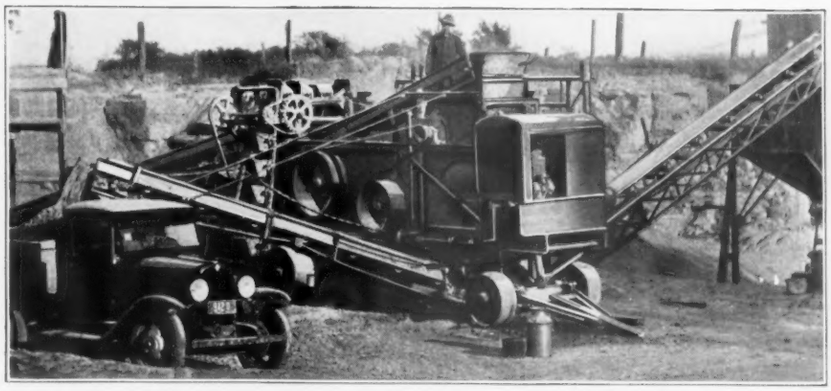
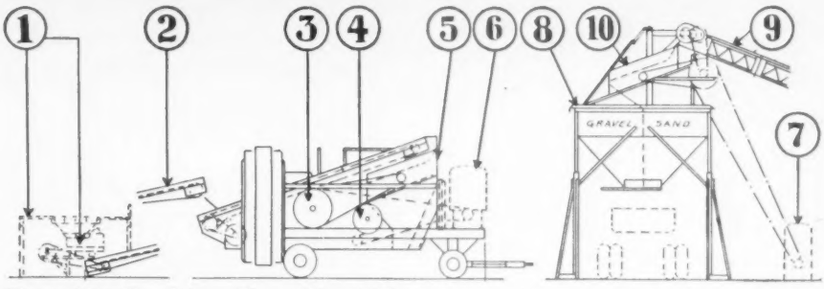
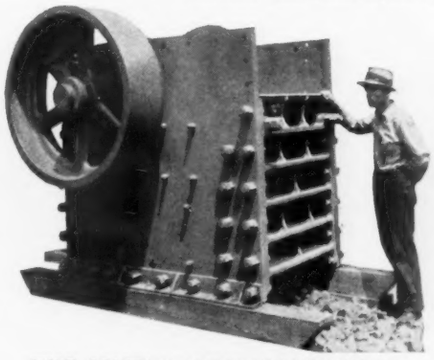




Portable Crushing Plant No. 100, installation photo and detailed diagram shown above. (1) Mechanical feeder and loading trap (optional). (2) 30' by 24" roller bearing conveyor from mechanical feeder to crusher. (3) 9 by 40 crusher. (4) Reduction crusher. (5) Gyrating screen, 2 1/2 deck. (6) Motor, with belt (optional). (7) Motor for driving conveyor to screen and screen itself (optional). (8) 15-yard steel bin, two compartments. (9) 57' by 24" roller bearing latic conveyor—need not operate at right angles to crusher. (10) Single deck gyrating screen. Length of crusher unit, including conveyor, approximately 56 feet; width of plant, approximately 70 feet.

This and other plant layout diagrams will be sent on request.



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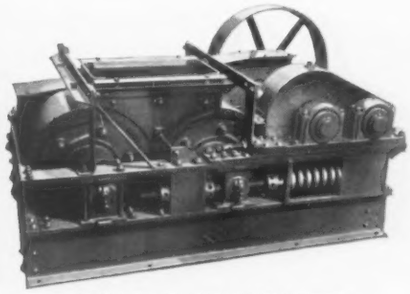

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National Sand & Gravel Association
National Slag Association

and

National Ready-Mixed Concrete Association

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Subjects of great importance to every producer will be discussed and you can not afford to be absent. The prospect of future and state legislation affecting the conduct of your business is one of the problems which will confront all business men. Far from being a favored exception, your business—being concerned with the production of raw materials essential to nearly all types of construction—is certain to be one of those of the greatest interest to legislators and administrators who are really concerned about business recovery. The situation is one to which you can not remain indifferent and be mindful of your own interests.

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Remember the place—

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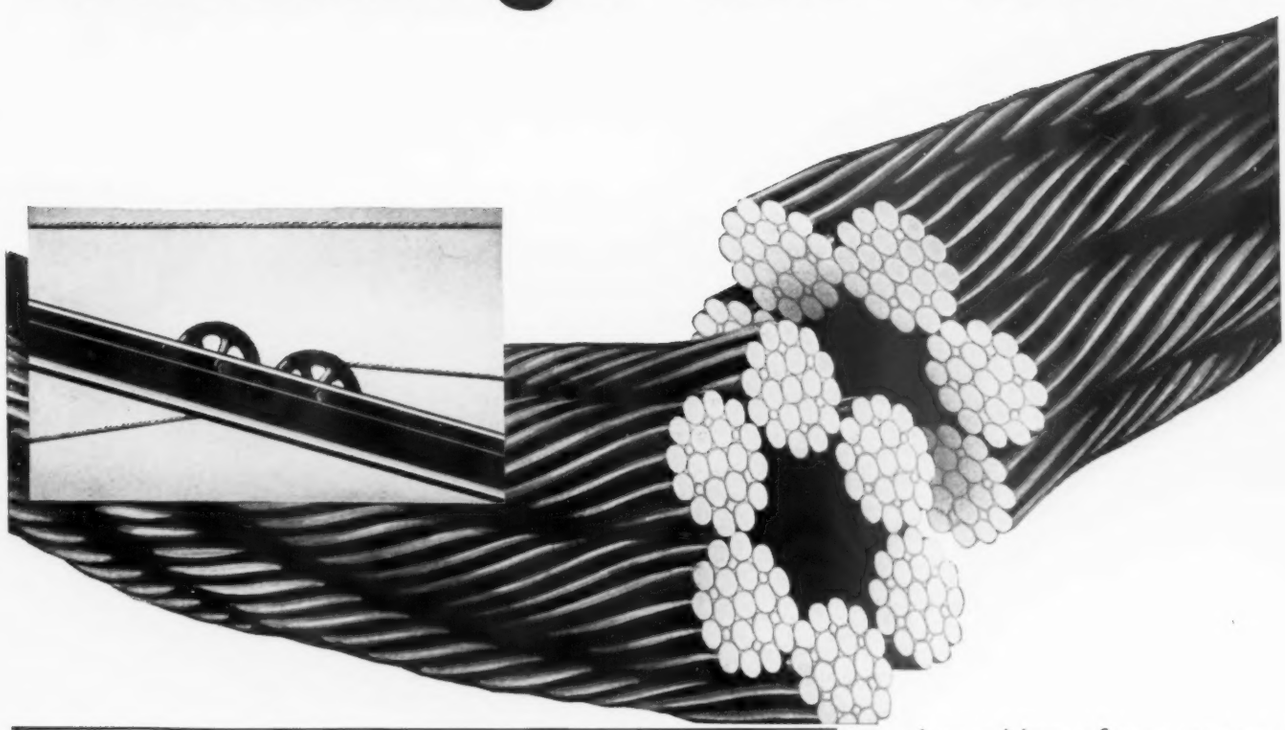
Exchange the Ends



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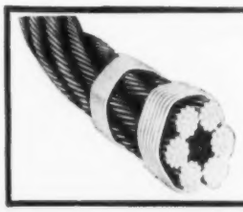

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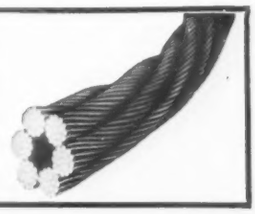

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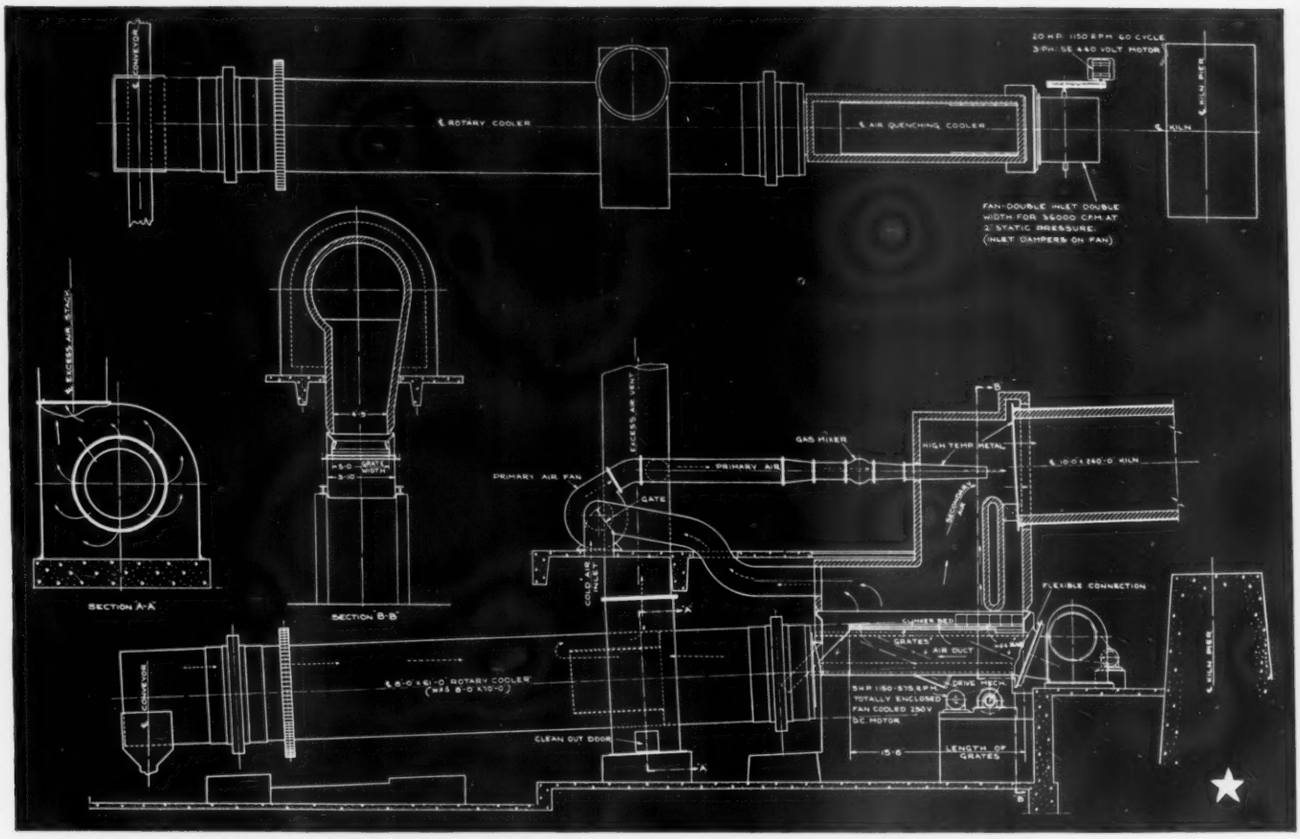

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THE ALLIS-CHALMERS Air Quenching Clinker Cooler is designed and manufactured to suit the particular requirements of your installation and may be used independent of or in conjunction with an existing cooler. ★ It is so constructed and operated as to give a rapid air quenching effect to the clinker and at the same time utilize the greatest portion of the sensible heat of the clinker for combustion in the kiln.

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This will be the "book of the year" in reader interest, in reference value, and in market coverage. Besides going to the regular Pit and Quarry producer subscription list—still the largest producer circulation since 1929—this "Buyers' Number" will be distributed at

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THE NATIONAL READY-MIXED CONCRETE CONVENTION at St. Louis

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The Buyers' Number of the New Year

also copies will be sent to all other producing plants in America, not already on the list—which means 100 per cent coverage.

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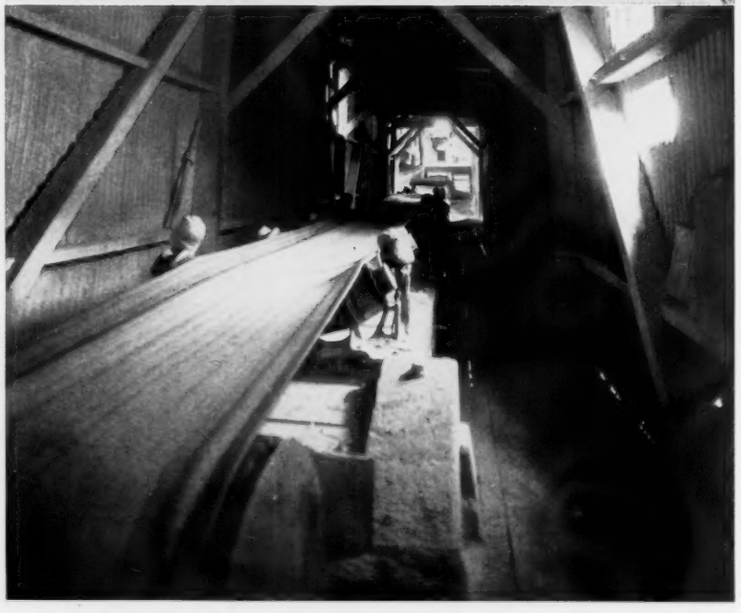

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VOLUME 28 NUMBER 5

Pit and Quarry

With which is consolidated

CEMENT-MILL & QUARRY

CHICAGO, NOVEMBER, 1935

Gravel, Stone, Slag Conventions and Show

CONCRETE MEETING FOLLOWS

The National Sand and Gravel Assn. and the National Crushed Stone Assn. will hold concurrent annual conventions at the Hotel Jefferson, St. Louis, Mo., during the week of Jan. 27, 1936. An interesting and instructive feature will be the Joint Machinery and Equipment Exposition of the Manufacturers' Divisions of the two associations, the membership of which is composed of the leading manufacturers of machinery, equipment and supplies used in these industries.

In addition, the National Slag Assn. will also meet at the same time and place.

These three organizations are cosponsors of the Mineral Aggregates Institute, and they will meet under the auspices of the Institute for a joint program on Jan. 29. There will be a number of important addresses, including a talk by John C. Gall, assistant counsel for the National Assn. of Manufacturers and a nationally recognized authority on Federal legislation dealing with labor relations and social security. On Wednesday evening, Jan. 29, there will be a joint dinner. On Jan. 30 the individual associations will resume their independent sessions; technical and marketing problems will be discussed and officers elected.

All inquiries regarding the exhibit should be addressed to Joint Exposition Committee, Manufacturers' Divisions, National Crushed Stone Assn. and National Sand and Gravel Assn., 453 Munsey Bldg., Washington, D.C.

Later in the week the National Ready Mixed Concrete Assn. will meet at the Hotel Jefferson.

Robert Lesley, Pioneer Cement Producer Dies

Robert W. Lesley, pioneer cement manufacturer, first president of the Portland Cement Assn. and the man who, more than any other, is credited with bringing about the use of American-made Portland cement in place of the imported product, is dead. He was 82 years old when he passed away at his home in Haverford, Pa., Nov. 9. Funeral services at Bryn Mawr, Pa., Nov. 13, were attended by many prominent figures in the cement world, who knew and revered the "grand old man" of the industry.

Mr. Lesley was assistant editor of the *Philadelphia Ledger* in 1874 when he founded the firm of Lesley & Trinkle, to engage in the business of selling cement. In 1883 he organized the American Cement Co. and was its president. This later became the Giant Portland Cement Co., of which he was a director until his death. He was the man whose arguments, backed by accurate scientific knowledge, led to the use of millions of barrels of American-made Portland cement on the great Croton Aqueduct, when original specifications had called for imported cement. At the time of his death, Mr. Lesley was an honorary member of the A. S. T. M., P. C. A., A. C. I., A. C. S., A. S. C. E., and the British Chemical Society. He was the author of many scientific papers on Portland cement, and was the coauthor, with John B. Lober and George S. Bartlett, of a *History of the Portland Cement Industry in the United States*, published in 1924.

Robert W. Lesley

Home Building Hits $400,000,000 Mark

$41,810,800 IN SEPTEMBER

Residential building improvement continues as the most important single development in the field of construction. With the September contract record included, home-building in the 37 eastern states, has finally arrived, on its emergence from the depression, at the $400,000,000 mark for a 12-month period, according to a statement of F. W. Dodge Corp. For the twelve months ended April, 1933, the residential total was only $225,000,000.

The September residential contract total for the 37 eastern states amounted to $41,810,800, as contrasted with $40,528,300 for August and only $17,853,600 for September of last year. For the initial nine months of 1935 the contract volume totaled $338,907,500 as against only $188,080,100 for the corresponding period of 1934. This gain of about 80 per cent. in home-building between the two years was entirely due to improvement in private activity as distinguished from public housing undertakings.

Despite the important improvement in residential work witnessed thus far this year the total volume of construction covering all classes of projects has failed to attain the cumulative volume reported for the initial nine months of 1934. For that period the total in the 37 eastern states was reported as $1,203,507,200, as against $1,191,697,700 for the first nine months of 1935. The losses from last year's record centered chiefly in governmental projects of heavy engineering types, such as bridges, highways, water-supply systems, sewage systems and the like.

For September alone the total awards for all classes of construction were reported at $167,376,200, as contrasted with $168,557,200 for August and only $110,151,200 for Sept., 1934.

Hein Basalt Company Makes Improvements

★ It is reported that the Hein Bros. Basalt Rock Co., Petaluma, Cal., has installed new sand bunkers and an elevator for unloading sand, and for mixing sand and crushed rock for concrete. A modern road grader has also been added to the equipment.

TVA Awards Contract for Sand and Gravel

1,000,000 TONS FOR PICKWICK

The Tennessee Valley Authority has awarded a contract for furnishing approximately 1,000,000 to 1,200,000 tons of sand and gravel for concrete aggregates for Pickwick Landing Dam. The successful bidder is the Cumberland River Sand Co., to whom the award was made under Schedule 1A, Alternate Plan B, at a unit price of 49.9 c. per net ton. This company has the contract for furnishing aggregates for Wheeler Dam and is operating a gravel dredge on the Tennessee River not far from the point where the aggregates to be used in the Pickwick Landing Dam will be obtained.

The invitation to bid had two plans for furnishing aggregates, of which Schedule 1, Plan A, required the contractor to furnish processed aggregates in barges along the side of the cofferdam, adjacent to the mixing plant, and at other approved points. In this plan the contractor was required to maintain a stock-pile of approximately 50,000 tons of usable aggregates in proportions called for in the contract and continue to maintain a supply of aggregates until the completion of the work.

Under Schedule 1A, Alternate Plan B, covering the contract as awarded, the Authority will maintain a stock-pile of from 200,000 to 250,000 tons of processed aggregates and the contractor will deliver processed aggregates in barges at unloading docks provided by the Authority. It will be possible under this plan for the contractor to build up the stock-pile to such an extent during favorable seasons that it will not be necessary to operate the gravel dredge at all times. Under Schedule 1A, Alternate Plan B, the agreement under which the contract has been awarded is that all the sand and gravel will be delivered and the operations completed by Sept. 15, 1937.

The grading requirement of the coarse aggregates under Schedule 1, Plan A and Plan B were identical, being as follows:

	Sieve Square Openings (in.)	(per cent. passing)
Pea Gravel	¾	90 to 100
	No. 4	0 to 5
Intermediate Gravel	1½	90 to 100
	¾	0 to 10
Coarse Gravel	3	100
	1½	0 to 10

Under Schedule 1, Plan A, the grading of the fine aggregate was specified as follows:

Coarse Sand	Percentage by Weight
Total retained on No. 4 sieve.	0 to 3
Total retained on No. 30 sieve.	80 to 100
Fine Sand	
Total retained on No. 30 sieve	0 to 10
Total retained on No. 100 sieve	90 to 100

Under Schedule 1, Plan B, one size of sand only is to be furnished and the specification requirements are that it shall be graded so that not more than 3 per cent. will be retained on a No. 4 sieve and the fineness modulus shall not be less than 2.0 nor more than 3.5.

Chas. M. Upham Accepts Maryland Roads Post

Charles M. Upham, engineer-director of the American Road Builders' Assn., has been appointed Consulting Engineer to the Maryland State Roads Commission. Mr. Upham has assumed this additional work and is engaged in a series of conferences with the Commission relative to the current highway program in Maryland. The proximity of Baltimore to Washington will make it possible for him to keep in close contact with the two offices. It was revealed that the Maryland Commission is drafting a highway program that will utilize all available Federal and state funds on highway-construction projects and make the state's highway system adequate for its rapidly-growing traffic.

46-Acre Factory Site for Making Rock Wool

Approval of the sale of 46 acres of land, valued at $10,000, in the Huntington Speedway, Inc., receivership, to the Western Rock Wool Corp. to be used as a factory site, was entered by Judge Sumner Kenner of the Huntington, Ind., Circuit Court on Sept. 27.

This company was formed some time ago by Bert B. Williams of Marion, Paul M. Taylor of Huntington, and Adam L. Beck of Buffalo, N. Y. The incorporators are Messrs. Williams, U. S. Lesh and James E. Lesh, the latter two of Indianapolis. Mr. Beck is president of the Great Lakes Portland Cement Corp.

Basalt Firm Building Big Shipside Terminal

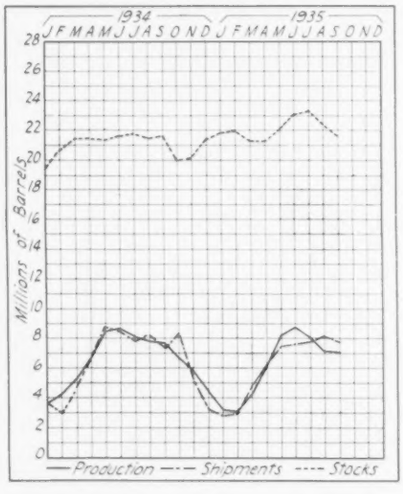
★ It is expected that the shipside terminal of the Basalt Rock Co., in South Vallejo, Cal., which may prove to be an opening wedge in an intensive industrial development in the city's grass-grown tidelands, will be completed this winter, according to A. G. Streblow, president. Construction of the 40-ft. by 160-ft. wharf will be under way in about 30 days, as soon as the long fill from the Southern Pacific tracks to the city bulkhead line is completed. Into the fill will go 120,000 cu. yd. of earth. At the present time the company's 2½-ton electric shovel, 4 trucks and 20 men, working in 2 shifts, are engaged in the earth-moving job. While the Basalt Co. does not at present intend to construct a plant in Vallejo, it will use the terminal to bring in supplies and ship out rock and gravel.

Cement Output in September Below 1934

STOCKS 0.3 PER CENT. HIGHER

The Portland-cement industry in September, 1935, produced 7,173,000 bbl., shipped 7,799,000 bbl. from the mills, and had in stock at the end of the month 21,789,000 bbl. The production of Portland cement in September, 1935, showed a decrease of 6.6 per cent. and shipments an increase of 5.6 per cent., as compared with September, 1934. Portland-cement stocks at mills were 0.3 per cent. higher than a year ago.

The total production for the nine months ending Sept. 30, 1935, amounts to 56,066,000 bbl., compared with 60,781,000 bbl. in the same period of 1934,



Cement production, shipments and stocks to September, 1935.

and the total shipments for the nine months ending Sept. 30, 1935, amount to 55,651,000 bbl. compared with 58,700,000 in the same period of 1934.

The statistics here given are compiled from reports for September, received by the Bureau of Mines, from all manufacturing plants except one.

In September cement production was 32.6 per cent of the capacity of the 162 plants reporting, as compared with 34.8 per cent. for the 163 plants reporting for the same month of last year. For the 12 months ended with September, 1935, the ratio was 27.3 per cent. compared with 27.6 per cent. for the previous year. The production-capacity rate was 31.8 per cent. in August, 35.3 in July and 39.6 in June.

New Gravel Pit Being Opened at Hennepin

★ Work is progressing rapidly on the new gravel pit in Hennepin, Ill., recently purchased by Charles N. Tyler and Son of Granville. Gravel handling machinery, consisting of a stone crusher, screen and conveyors are being installed and later a steam shovel for handling the gravel will be put in.

Equipment Builders Form New Trade Body

HAS 38 CHARTER MEMBERS

Twenty-four representatives of construction equipment manufacturers met in Chicago, Nov. 1, to form the Construction Equipment Assn. The new organization aims to set up fair methods of competition as far as laws will permit, which are fundamental and applicable in all parts of the industry, but which do not conflict with fair trade practices approved by an existing trade association or organized group in the industry, and to afford a place through which complaints alleging violation of such fair trade practices may be filed by members of the association or its affiliated distributors; to act in the arbitration of differences which may arise between members of the industry or its affiliates; to collect information, gather statistics, and work out analyses when required; to conduct a campaign of education among members of the industry and its affiliated distributors with the object of procuring voluntary adherence to fair methods of competition without the necessity of resorting to compulsory methods; to defend the industry and any of its component groups or affiliations from discrimination or aggression, and to encourage legislation which will tend to improve conditions in the industry, and to oppose any legislation found detrimental thereto; to coöperate in improving the relations between the manufacturers, distributors and consumers; to interest itself only in the problems of the industry which affect the stabilization of the merchandising of its products; in the interest of employment in the capital goods industry, and economy in the construction of any project, to promote the use of machinery as against costly hand-labor methods; and to carry on any other lawful activities in the interests of the industry.

The members of the organizing committee were elected directors to serve until the first annual meeting in January. They are: S. P. Beatty (Austin-Western Mfg. Co.), O. G. Mandt (Jaeger Machine Co.), J. R. McGiffert (Clyde Iron Works), William Parrish (International Harvester Co.), L. W. Yerk (Pioneer Gravel Equipment Co.), W. B. Greene (Barber-Greene Co.), George M. Etnyre (E. D. Etnyre Co.), C. L. Dunham (Sullivan Machinery Co.), and Morgan Butler (Butler Bin Co.).

The following officers were elected: President, S. F. Beatty; first vice-president, O. G. Mandt; second vice-president, Morgan Butler; secretary, William Parrish; treasurer, C. L. Dunham; William Ogden will be the executive secretary. Thirty-eight manufacturers have joined the organization as charter members.

The first annual meeting will be held in the Statler Hotel, Cleveland, at 2 p.m. on Jan. 18, 1936. The association's headquarters are at 410 N. Michigan Avenue, Chicago.

$27,000,000 for Road Projects in 41 States

The Bureau of Public Roads, Washington, D. C., on Oct. 16 announced the approval of 682 specific highway projects in 41 states and the District of Columbia, on which work will be started immediately under the $4,000,000,000 work-relief program. The approvals on Oct. 16 totalled $27,557,700. The approval of 120 grade-crossing elimination projects in 27 states, at a cost of $8,717,050, also was announced. Contracts already have been awarded on 161 highway projects and 41 grade-crossing eliminations.

2,000,000-Bbl. Cement Order Goes to Superior

The Superior Portland Cement Co., Inc., Seattle, Wash., has been awarded a contract for 2,000,000 bbl. of cement for the Grand Coulee Dam. President E. P. Lucas has stated that enough cement is ready for the first big shipment. The Seattle and Concrete plants will supply the cement and at least 80 men will have steady employment at the Concrete plant for two years.

Boettcher Cement Plant Reopens for Second Run

After closing the latter part of July, and not expecting to resume operation again until January 1, it is reported that the Boettcher, Colo., plant of the Colorado Portland Cement Co. will open for a second and entirely unexpected run this year. The new run, it is thought, will last two and one-half or three months.

Cement Plant at Dewey Reopens, Employing 290

The plant of the Dewey Portland Cement Co., Dewey, Okla., reopened on Oct. 14 with 290 employees returning to work, after having been closed since Sept. 1. During the shut-down the plant underwent needed repairs. Better business conditions and the prospect of material contracts in the government's huge road-building program were attributed by General Manager Don Tyler as reasons for resuming operations.

Will Build $100,000 Michigan Silica Plant

★ The Michigan Silica Co., Flat Rock, Mich., plans the establishment of a silica-sand refining plant to include concrete and steel storage-bins and buildings, crusher, screen plant, driers, etc., and to cost about $100,000.

Pioneer Gravel Gets RFC Betterment Loan

$100,000 PROGRAM UNDER WAY

The Pioneer Sand & Gravel Co. has started its $100,000 building program at its holdings on Puget Sound near Steilacoom, Wash. Construction of two large sand-and-gravel washing plants is under way, calling for the building of one of the most modern plants of its type in the United States. Six years ago the two hydraulic gravel-washing plants located there were shut down when an agreement was made with the Glacier Sand & Gravel Co., operating a new electrified plant, to supply the sand and gravel demands of the Pioneer company's retail yards, located in Seattle, Tacoma and other Sound cities.

Reports that the Pioneer company had obtained a large RFC loan were confirmed when actual construction of the new plants was begun. A 300-ft. loading dock is being built by the Hart Construction Co. of Tacoma, while the main plant is being built by the Sound Construction Co., under the direction of Herbert Mills, long identified with the management of the Pioneer Sand & Gravel Co.

For the past 30 years, prior to the shut-down of the Pioneer plants, the hydraulic sluicing method of obtaining the gravel was used. This system made it impossible to reach all the deposit, which is 450-ft. thick above tidewater level, as all the sluiced material had to flow into the bunkers by gravity. The new system consists of a series of conveyors operating in large wooden tunnels laid just above the high-tide level and under the railroad tracks. One bunker will be capable of delivering 100 car-loads of washed material, to railroad cars, while the other will have an equal capacity for loading barges with a special dumping mechanism.

Large electric shovels will be used to drag down the banks and scoop the material on the conveyors. Revolving screens and a fresh-water washing system are used in the bunkers to sort the material into 20 different sizes of sand and gravel for building purposes. Salt-water-washed gravel is not as desirable for concrete work as that washed in fresh water, which will be procured from a large fresh-water lake, created by former digging operations.

More than 25,000,000 tons of sand and gravel have been taken from the vast deposits near Steilacoom by three companies.

The new Pioneer plant will be in many respects an exact duplicate of the large Glacier plant, which is said to have been the first of its type to be built in the United States.

The Woodstock Slag Co. has started operations at Anniston, Ala., in addition to its Birmingham plant.

Portable Plants Aid Established Producer

HELP PROTECT HIS POSITION

"We have a crushed-stone plant at Cedar Rapids, and a crushed-stone plant at Gladbrook, and a sand-and-gravel producing plant in Cedar Rapids," says S. P. Moore, president of Builders' Material, Inc. "We felt that in order to maintain our position in the market we would, of necessity, have to get into the portable crushing business.

"There are a number of deposits varying in size and character, and the stone in them can be favorably and advantageously used for road surfacing. There is not a great deal of local gravel. We recognize that it is impossible for the counties and the state to build many miles of this surfaced road at the price we must get for our product, when it is loaded on cars and shipped any considerable distance. We observed other portable operations before deciding definitely.

"We have three or four portable operations going on. They vary in size from single crusher outfits that produce 125 to 150 cu.yd. of material a day, to outfits producing 500 cu.yd. of material a day. We would not be interested in purchasing any further equipment that could not be transported from one point to another.

"In other words, in Iowa there are no large metropolitan areas, therefore no concentration of business. Any production plant in Iowa that has a capacity of 1,000 tons per day is at the present time sufficient in size to take care of all the material that can be secured for it in the area where it can be marketed. The plant and equipment that can produce this much tonnage per day can easily be secured at the present time in portable form —in other words, a ¾-cu.yd. shovel, trailer and hauler, jaw crusher, screens and bins. That is our point of view, nothing original about it, and nothing about it that we could get metropolitan producers to see and agree on.

"As to ready-mixed concrete, we are in a good industrial town. There are some 30,000 or 40,000 cu.yd. of concrete consumed in this market per annum. We have just recently installed two Johnson bins, a batch weigher, and a couple of Jaeger mixing trucks —1½ cu.yd. to a load.

"We have relations with a competitor, who also owns some mixing trucks, for interchange of vehicles so that we can handle large 'pours' of concrete. At present we are furnishing 200 cu.yd. of concrete each 12-hour period on a continuous pour, on concrete bins which are being built for the Quaker Oats Co. in Cedar Rapids. This will take 15 to 18 days, running day and night. Our experience is highly satisfactory; our customers are highly pleased. The most important part to us is that it will eventually take out of the market the unit price on a ton of stone and on a ton of sand, which is easily broken down by competitors who have no regard for profit and no knowledge of cost."

Gets 250,000-Ton Gravel Order for Building Dam

Reinhold & Co., Inc., Pittsburgh, Pa., according to P. B. Reinhold, secretary and treasurer, have secured a contract for approximately 250,000 tons of Allegheny River sand and gravel to be used in the construction of lock and dam No. 9 at Rimerton, Pa. Shipment will be made from the plant of the Allegheny River Sand Corp. at Reesedale, Pa.

John Treanor, Cement Official, Dies in Fall

John Treanor, Los Angeles, Cal., 52-year-old president of the Riverside Cement Co., fell to his death on Oct. 20, while working on his ranch in a mountain valley. Going to the roof of a barn to trim overhanging trees, Mr. Treanor slipped and fell 25 ft. to the ground, dying almost instantly of a fractured skull. For many years Mr. Treanor had been active in public affairs and, in addition to being the president of the cement company, was an officer of many other industrial and financial institutions. He had been with the Riverside Cement Co. since 1907, starting as sales manager, five years later being made general manager. Since 1928 he had been president of the company. Mr. Treanor is survived by Mrs. Treanor, two sons, Thomas Coghill Treanor of Los Angeles and John Stanley Treanor of Napa, and one daughter, Mary Elnore of Los Angeles.

Stone Plant Destroyed by Acetylene Explosion

Due to an explosion in an acetylene tank the Lilmay plant of the Kentucky Consolidated Stone Co. at Stephensburg, Ky., was destroyed by fire on Oct. 15, the damage amounting to about $25,000. No one was injured, but the entire plant was burned and the machinery badly damaged. The loss was partially covered by insurance.

Plans for Aggregates Body in Ohio Dropped

Ohio sand and gravel producers met in Columbus recently and considered plans to re-establish association activities which, during the past two years, were carried on through the headquarters of the Code for the Crushed Stone, Sand and Gravel and Slag Industries. This organization, to have been designated as the Ohio Sand & Gravel Assn., with headquarters at Columbus, Claude L. Clark, executive secretary, was not completed as it was deemed unwise to consummate the plans now.

FHA Modernization Loans Total 515,159

VALUE OF WORK IS $990,001,327

Building activity is extremely pronounced in every part of the country, as more and more persons are taking advantage of the Federal Housing Administration's Modernization Credit Plan and "Single Mortgage System."

During the week ended Oct. 26 there were 15,990 loans under the Modernization Credit Plan reported by financial institutions which extended the loans under Housing Administration insurance contracts. These totaled $5,321,840. That brought the total loans reported since the start of the modernization program 14 months ago to 515,159, valued at $190,660,564—all private capital.

Financial institutions reported 1,533 mortgages selected for appraisal totaling $5,116,292 during the same week. The cumulative total since the start of the mortgage program last December is 53,074, amounting to $205,306,531, also all private capital.

The field offices of the housing administration reported that $26,310,854 worth of modernization and repair work had been developed by the program during the week ending Oct. 26, but not financed by the Modernization Credit Plan. This figure brings the total work developed since the start of the program to $990,001,327.

Protests Prevent Rock Crusher Installation

Deciding that it would constitute a public nuisance, the City Council of Sierra Madre, Cal., recently refused the application filed by Lawrence M. Schneider of Sierra Madre and H. E. Cox of Pasadena for permission to erect a stone crusher in Sierra Madre. Protests were so numerous and emphatic that the council did not even grant a hearing on the merits of the application.

★ The Pennsylvania Blackboard Co., Slatington, Pa., has just placed an order with the Buckeye Machine Co., Lima, O., for a 187½ Buckeye Diesel generator set. This engine will furnish power to operate the whole plant and replaces purchased power. It is estimated that the Diesel savings will amortize the cost of the new engine in less than 40 months.

★ The Malden Crushed Stone Co. is installing four double-deck vibrating screens in the screening plant of its Saugus, Mass., trap-rock quarry. The screens were furnished by the Kennedy-Van Saun Mfg. & Eng. Corp. through the H. R. Jaques Co., Boston, Mass.

★ Two ⅝-cu.yd. Champion excavators have been installed by the Keener Sand & Clay Co., Columbus, O.

Business Rising, Say Late Financial Reports

PROFITS UP, LOSSES DOWN

The Ideal Cement Co., Denver, Colo., has notified all debenture holders that the company will buy at 102 and interest to Jan. 1 all debentures that are offered. There are $1,386,000 outstanding, paying 5 per cent. Ideal Cement has a large accumulation of cash on hand and wants to use this to reduce interest charges.

The International Cement Corp., New York, N. Y., and subsidiaries, for the quarter ended on Sept. 30, subject to year-end adjustments, reports a net profit of $299,707 after depreciation, interest, reserve for income taxes and contingencies, equivalent to 48 c. a share on 626,278 no-par shares of capital stock, excluding 10,700 shares held in the treasury. This compares with $339,418, or 54 c. a share in the preceding quarter, and $185,591, or 29 c. a share in the September quarter of 1934. For the 9 months ended Sept. 30 the net profit was $754,728, equal to $1.20 a share, comparing with $532,564, or 85 c. a share for the same period in 1934.

The International Cement Corp., New York, N. Y., is notifying holders of its 20-year, 5 per cent. gold debentures, due May 1, 1948, that it will redeem on Nov. 1, 1935, at 103¼ per cent. of the principal amount, together with accrued interest to the redemption date, $5,000,000 principal amount of these debentures.

The North American Cement Corp., Albany, N. Y., reports for the 12 months ended Sept. 30 a net loss of $438,112 after taxes, depreciation, depletion, interest and amortization, comparing with a net loss of $129,569 for 1934.

The Texas Gulf Sulphur Co., New York, N. Y., reports for the 9 months ended Sept. 30 a net income, after depreciation, amortization, taxes and other charges, of $5,265,209, equal to $1.37 a share on 3,840,000 no-par shares, against $5,250,380, or $1.37 a share last year. For the quarter ended Sept. 30, the net income after similar deductions, $1,810 038, was equal to 47 c. a share on 3,840,000 shares, against $1,914,302, or 50 c. a share in the previous quarter, and $1,899,155, or 49 c. a share in the September quarter of 1934.

The Pennsylvania - Dixie Cement Corp., New York, N. Y., and subsidiaries, show for the 12 months ended Sept. 30 a profit of $1,083,950 before depreciation, depletion and interest, compared with a profit of $978,425 for the 12 months ended Sept. 30, 1934.

The Lehigh Portland Cement Co., Allentown, Pa., reports for the 12 months ended Sept. 30, 1935, a net profit of $265,712, equal to $2.14 a share on 124,072 shares of 7 per cent. preferred stock, excluding reacquired shares. This compares with $495,853, or $3.14 a share on 157,817 preferred shares for the 12 months ended Sept. 30, 1934.

The preliminary report of the Alpha Portland Cement Co., Easton, Pa., for the 12 months ended Sept. 30, 1935, shows a net loss after taxes, depreciation, minority interest and other charges, of $269,181, against $259,776 loss for the 12 months ended Sept. 30, 1934. Deficits after dividends for the 12-month periods were $972,115 and $399,776, respectively.

The Rockland & Rockport Lime Co., Inc., Rockland, Me., report a net loss for the year ended Dec. 31, 1934, of $85,290 after depreciation, depletion and interest charges, compared with a net loss of $176,796 for the year ended Dec. 31, 1933.

The Consolidated Cement Corp., Chicago, Ill., reports a net income for the quarter ended July 31, 1935, after depreciation and other charges, of $41,536, equal to 41 c. per share on 100,617 Class A shares outstanding.

The directors of the Superior Portland Cement Co., Seattle, Wash., have declared a dividend of 55 c. per share on the Class A stock, payable Nov. 1, to stock of record Oct. 23, and ex-dividend on the San Francisco Curb Exchange Oct. 18. This payment is for two deferred monthly dividends and leaves the arrearage on the A stock at $2.75.

Kentucky Rock-Asphalt Men Form Association

The Kentucky Rock Asphalt Institute, with offices in the Marion E. Taylor Bldg., Louisville, Ky., was recently organized. George Rapp, vice-president of the Ohio Valley Rock Asphalt Co., has been elected president. Other officers are Walter Areta, vice-president; W. N. Bosler, secretary-treasurer; and Rodman Wiley, Phil McGovern and G. C. Appleton, directors. A. H. Hinkle is executive director.

North American Cement Building Concrete Silo

★ The Nicholson Co. of New York is building a concrete silo for the North American Cement Corp. at Alsen, N. Y., which will be completed in about a month. Owing to a decided increase in the demand for cement, it was expected that the Alsen plant, which has been idle for several weeks, would resume full operation on Oct. 15, employing about 150 men.

Crushed-Stone Producer Buys Crusher, Screen

★ The Massachusetts Broken Stone Co. of Stony Brook, Mass., has purchased its second Kennedy gearless ball-bearing crusher, equipped with synchronous motor, and its third Kennedy vibrating screen. This is the second order this year. The equipment was furnished by the Kennedy-Van Saun Mfg. & Eng. Corp., through the H. R. Jaques Co., agent at Boston.

Railroads Prepare Cars for Bulk Cement

WILL SHIP 5,000,000 BBL.

The work of conditioning hundreds of box-cars for the job of transporting some 5,000,000 bbl. of bulk cement from Washington cement plants to the Grand Coulee damsite, the huge federal project on the Columbia River, 92 mi. west of Spokane, is now under way in the Spokane shops of the Great Northern, Northern Pacific and Milwaukee Railroads.

The present transportation schedule calls for the delivery of 50,000 bbl. of bulk cement during October, the same amount during November, 100,000 bbl. during December and increasing amounts thereafter.

Arrangements for the storage of 40,000 bbl. of bulk cement have been made at the damsite. The cement will be taken from the cars by a screw conveyor to a pneumatic air chamber, from which it will be carried to the storage tanks by air pressure. A pneumatic tube conveyor is also being arranged to carry the cement from the storage tanks to the mixing plant.

The Great Northern is making some 60 box-cars waterproof and tight to handle shipments from the Coast mills at Concrete, Bellingham, Seattle and Grotto. About 250 cars will be repaired before the shipments are completed. The Northern Pacific soon will start repairing 50 or more cars at Parkwater to care for the shipments from the Spokane plant at Irvin. The Milwaukee road also is working over a number of its cars for the product of the Lehigh plant at Metaline.

Ahearn Urges Dealers Work for More Roads

New laws affecting stone and gravel dealers were discussed by V. P. Ahearn, Washington, D. C., executive secretary of the Mineral Aggregates Institute, at a meeting of the Indiana Mineral Aggregates Assn. in the Claypool Hotel, Indianapolis, Ind., on Oct. 22. He urged dealers to ask that a large portion of the Federal funds for public improvement be used in the construction of permanent works, such as roads and bridges. S. C. Hadden of Indianapolis, executive secretary of the Indiana organization, presided.

★ The Connersville Gravel Co., Inc., Connersville, Ind., has been purchased by Clyde Piper. Mr. Piper has reorganized the firm and changed the name to Connersville Gravel, Inc. Machinery at the plant has been rearranged and plans have been made to install new machinery.

★ A Lee Process clinker cooler will shortly be erected at the Rio de Janeiro, Brazil, plant of the International Cement Corp. This is the largest installation the Cement Mill Equip. Co. has made a 3,250 bbl. unit.

Editorial

Can Capitalism Survive?

FOR a long time this question has aroused keen interest and provoked animated discussion among academicians and political revolutionaries, but it is only in the last few years that business men, capitalists themselves, have had occasion to view this aspect of modern life objectively. Prior to the trying period through which business has been passing most men engaged in profit-motive pursuits were content to accept capitalism as an inseparable — even if not as the most important —part of a long-established social order. They believed quite sincerely, although erroneously, that it had been an inherent characteristic of human existence from prehistoric times. A few of them who had dared to peer beyond the confines of their prejudices thought that they saw the beginnings, as well as the social justification, of capitalism in the origin of property and property rights, and attempted in fantastic ways to make capitalism such an essential part of human nature as to render any changes in its principles quite as unthinkable as its elimination would be.

Of course, no one acquainted with the economic phases of social history either committed this error or, if reared with it, remained long under its spell. Those who seriously studied the historical background of capitalism recognized it as one of numerous steps in the economic advance of mankind, a developmental stage which, besides being the inevitable result of preceding causes, carried within itself many of the factors that would just as inevitably determine the form and development of its successor. Despite the truthfulness of this discovery and the extent to which it was given publicity, too many business men still regard the capitalism with which they are familiar as an immutable system, entirely self-sufficient and self-sustaining, and quite as insusceptible to change as it is above the need of change. To them capitalism as we have known it is a fixture, skilfully contrived by human ingenuity and adequate in every way to meet the needs of a modern society which is demanding the maximum supply of necessity and comfort satisfaction at minimum cost. They have failed to see that it is a constantly-changing, constantly-developing and constantly-improving system of production and distribution. They are unable or unwilling to recognize the fact that the chances of its successor being an improvement are even greater than the chances of its being a backward step. The generally-forward trend of human activities suggests to them no underlying law of progress, or, if it does, it seems to threaten the things they prize most.

The capitalism we know to-day is not the capitalism of Karl Marx's day, nor that of the period of the anti-trust laws, nor even that of delirious 1929, unless one understands capitalism to mean nothing more than a scheme of production for profit. We have become more or less accustomed to a capitalism that was a production-for-profit system in which the quest of gain was the sole motive and the sole ethical justification for every error, as well as for every advance, made under its rule. But it is possible to have a capitalism under which, without losing any of the incentive advantages of the profit motive, we shall have a spirit of gain coupled with one of service, in which there will be retained the best that was good in capitalism of the old type and to which will be added that regard for the well-being of society without which civilization can not move forward to new heights. We believe most sincerely that our industrial system has advanced beyond the old days of grinding the last hour of labor from workers, the last advantage from competition, and the last dollar from the consumer. In our opinion it is sufficiently mature to accept the social responsibilities that lie at its door, to adjust itself to the changed economic and social conditions which surround it, and to spare society from the pains and costs of attempts to abandon what contains so much of future usefulness in favor of something that may promise more but actually provide less.

WE say that we believe this to be true because we see in the utterances and actions of an increasingly large number of business men a recognition of the social obligations confronting business and society and a growing willingness to face the bald truth that reform in their attitude toward mankind as a whole, reform in their handling of the profit motive in its relation to other aspects of business activity, such as production, distribution and employment, is inescapable, if they would save what a long period of evolutionary development has given us. In the beginnings of capitalism there was no thought for the worker, the competitor or the consumer; there was no pretense that capitalism had been designed for anything other than the enrichment of capitalists. But during the last fifty years or more social problems have made the foundations of the old type of capitalism less secure; it has been threatened with annihilation from the collectivist forces that have attacked it from the outside; it has been faced with the possibility of collapse from an unwillingness to strive for adjustment within. This unwillingness to change, to accept the inevitable, is adding strength to the forces working against it from without, while it weakens the power of resistance within the system itself. The last few years have given us some notion of the nature of the calamities that might follow success on the part of the forces that are now superior.

The forces outside capitalism—that is to say, outside the ring of capitalistic production—have on their side a most formidable weapon in their insistence upon the welfare of the masses as the criterion of any system's social suitability. It is a theme that appeals strongly to the masses, in whom the numerical and therefore the physical strength for social action still reside, and it is one to which capitalism has given too little thought. Through its own actions and attitudes capitalism has made it difficult, if not impossible, to show that it has been interested in anything but profit making or that it was not almost wholly indifferent to the human needs of the populace. Despite some outstanding examples, whose number is still small compared to the total engaged in business enterprise, this is still the attitude of business men, it is still the mark by which the forces attacking capitalism recognize and identify it, it is still capitalism's chief characteristic.

BUT industry and capitalism are not synonymous terms. There can be industry for profit—the kind we know so well—and there can be industry for service—the kind we are asked to set up. There can be industry in which the profit motive crowds out all other considerations or grudgingly grants them second place, and there can be industry in which social service comes first while the economic incentive of private profit is retained to spur men on. There can be industry which recognizes no master but the insistent stockholder, no goal but large dividends and impounded surpluses; and there can be industry which acknowledges the suzerainty of service, the goal of a more abundant life.

Capitalism can be destroyed by the forces pounding at its doors, its foundation principle can be pulled down by the ethically and socially more appealing principles that are arrayed against it; but only if the exponents of capitalism are willing to accept this fate. Within the ranks of capitalism lie all the vitality, all the genius, all the initiative necessary to avert that catastrophe, if there be but a willingness to use them, a recognition of the need for using them. Capitalism contains within itself the powers that can effect its salvation by adapting itself to modern conditions; it has great capacity for self-regeneration; it has latent powers of survival that we little suspect.

Too few men, unfortunately, are aware of these potentialities as fully as they seem to realize the dangers. Too few men are attempting to delay what they fear to be the collapse of capitalism by the adoption of conciliatory measures, the attitude of concession, the spirit of willingly surrendering outworn shibboleths. Too few are willing to admit that the saving of capitalism will come, and can come, only through its transformation.

As we have often said before, the prospect of a capitalism transformed should frighten no one. Acceptance of the idea does not imply the abandonment of any irreplaceable rights or advantages. It can be defended solely on the basis of intelligent self-interest. If the gains of capitalism are worth saving—and we firmly believe that they are—they are worth study and understanding in the light of their long-time possibilities and effects. And, similarly, if we would measure accurately the potency of the principles that threaten it from without, we must examine them in the light of socio-economic history which clearly points the trend of future evolution.

The rights of individual property ownership on which capitalism depends can be preserved, the profit motive that is the moving force of capitalism can be saved, if capitalism is willing to effect the changes necessary to insure its survival. Certainly no one denies that capitalism could not live without the mass consumption which mass-production methods have made necessary. It is just as certain that capitalism can not live without the sympathy and cooperation of the masses. These can be won by the same means that have endeared capitalism to capitalists, the means that will provide a more plentiful supply of the necessities and comforts of existence for each one of us.

The old capitalism founded on the theory of high prices, long hours and low wages is the system that is being attacked from the outside, and it is the system which, if it continues to insist on adherence to the old principles, can not withstand the onslaughts of principles more nearly in tune with the needs of a new age. But the attitudes of increasing numbers of business men seem to promise that capitalism is entering a new stage in which lower prices, shorter hours and higher wages will be the basic ideals, designed not alone to placate the multitude and thus still the revolutionary urge, but also to insure the future safety of business on a profit-making basis. It would seem to be the part of wisdom to try to save capitalism by reshaping it to fit the economic pattern of the day, rather than to persist in methods that will make certain its destruction.

THE "isms" by which capitalism is assailed on every side promise much to the masses; what they would be able to deliver if actually in effect is only a matter of conjecture. We have seen what capitalism has done and we have reason to expect that it can do more, but its ability to provide the benefits which its opponents offer will depend on the readiness and promptness with which it is able to shift its objective from the old ruthless profit-taking unmindful of public interest to the new profit-making rooted in a desire to serve itself well by serving the masses well. That is, as we see it, the price capitalism must pay for the right to survive.

This is not the time for a stubborn insistence on the preservation of everything to which we have become accustomed; nor is it the time for a loss of faith in sound principles simply because they are the subject of attack on many sides. We repeat, capitalism as an economic system has within itself the means for salvaging those of its principles that are still valid. It has within its ranks the qualities capable of making the adjustments necessary to maintain those principles. What we hope to see more of is the spirit of adaptability, the readiness to recognize limitations that are glaringly apparent, and the desire to continue to improve what is good and to add what is better.

Silicosis and Other Diseases Covered by New York Compensation Law

Proposed Insurance Rates Show Big Increases Above Old-Base Charges

IN its 1935 session the New York legislature amended the New York Workmen's Compensation Act to provide coverage for all occupational diseases in all the employments enumerated under the law. This amendment brings silicosis and other respiratory diseases within the provisions of the compensation law and affects a number of employments wherein there is injurious exposure to inorganic dust hazards.

The Compensation Insurance Rating Board (370 Seventh Av., New York) presented to the state superintendent of insurance new rating plans for classifications subject to dust hazards as well as rates for such classifications under two separate and distinct plans.

Chapter 254 of the Laws of 1935, which became effective Sept. 1, 1935, affords compensation benefits for any and all occupational diseases, of which the most important group not previously covered is that of the dust diseases.

The first of the two methods contemplates coverage of the employer's obligations for compensation benefits subject to a payment of $300 by the employer toward each claim for disability lasting four months or longer. This is entitled Plan I.

A second method entitled Plan II provides for the employer indemnifying the carrier for 6/7 of each loss during the first year, subject to a maximum limit per claim.

Underlying both plans is the principle that these dust diseases are not of sudden development but take from 5 to 20 years of exposure before resulting in disablement or death. While the premium rates under Plan I cover the full cost of the benefits, less the reimbursement which the carrier will receive from the employer, the rates are established with full recognition of the fact that certain employees in industry already have a dust infection that will entitle them to benefits if they are exposed to the dust hazard on and after Sept. 1, 1935 and disability or death results.[1] This is in the nature of accrued liability against the insurance coverage which became effective on Sept. 1, 1935.

Plan II provides for an apportionment of the losses between the employer and the carrier although of necessity the insurance contract, as in Plan I, will make the carrier primarily responsible for all benefits. The apportionment is on the basis of 6/7 and 1/7 for the employer and carrier respectively on the assumption that an average exposure of 7 years underlies disablement and that any employee receiving benefits during the first year will have had at least 6 years of infectious exposure prior to the coverage being brought under the compensation law. During that period no compensation premium was paid for this hazard.

The rates submitted for approval under Plan I have been calculated on the basis of estimated benefit cost equivalent to one death or permanent total disability at an average cost of $7,200 for each 100 employees. Using an average wage of $1,500 per employee, this produces a pure premium of $4.80 and with the customary loading of 40 per cent. for expenses produces a basic rate of $8 per $100 of pay-roll. This basic rate is adopted for the foundry industry and rates for other industries were established by relating the hazard of other industries to that of foundries by engineering selection.

The rates underlying Plan II have been predicated on a benefit cost equivalent to two average death or permanent total-disability claims per 100 employees at a value of $7,400 per claim. After deducting 6/7 of the cost, as representing the proportion for which the employer must reimburse the carrier, the remainder is converted into a premium rate on an average wage of $1,500 per annum per employee. This results in a basic rate for the foundry industry represented by a pure premium of $1.41 which, when loaded to allow 40 per cent for expenses, becomes $2.35. As security for payment of the employer-assured's proportion of each loss a per capita deposit of $127 is required.

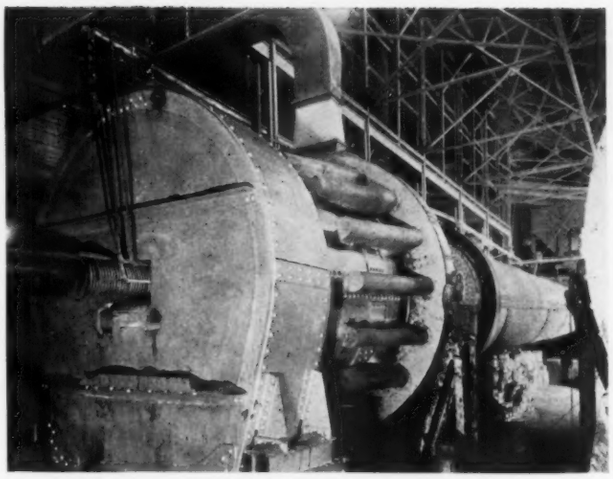
Referring to the proposals, Superintendent of Insurance Louis H. Pink says:

Certain inconsistencies are apparent in the development of the rates submitted. Although under both plans the carrier is primarily liable for the full benefits and must perform the same functions except for the differences in partial reimbursement from the assured, the expense loading in both plans has been calculated as a percentage of the pure premium. Since the pure premium in Plan II is based on net cost after reimbursement, it is materially lower in terms of the pay-roll rate than under Plan I. Granting, therefore, that under both plans there is an accrued loss to be considered in the rate it appears only proper that the loading should be based upon the proportion of the rate representing the hazard of future exposure and development to a claim status. Under these circumstances the expenses that are not required in a fixed ratio to the premium should be adjusted to a comparable basis in both plans. This results in a reduction in the expense loading to 20 per cent. in Plan I.

The average cost of a death and permanent total disability claim should be fixed at $7,250 based on New York State experience. After credit for the employer's contribution in Plan I this becomes $6,950. This would result in a basic rate for the foundry classification of $5.79 under Plan I. Permission has been requested, however, for authority to increase the rate where the occupational disease hazard is

(*Continued on page 30*)

[1] See *When Are Employees Entitled to Damages for Contracting Silicosis?* by Leo. T. Barker in PIT AND QUARRY, April, 1935, pp. 45-47, and August, 1935, pp. 31-34.



A typical installation of a "blown" kiln in a cement plant.

The "Blown" Cement Kiln

By A. W. CATLIN

FOR many years operators of rotary kilns have sought to improve performance, particularly in such matters as fuel economy, burning conditions and control. Progress has been made, but due to certain inherent faults in the methods employed, the results obtained in this direction are not altogether satisfactory.

Extensive operating experience has conclusively shown that the "blown" kiln[1] definitely offers the following advantages over customary practice:

1. Considerable saving in fuel;
2. Initial cooling of the clinker;
3. Greatly improved combustion with higher flame temperature;
4. Steadier operation;
5. Positive control of the combustion air;
6. Greatly improved quality of the product;
7. Better grindability of the clinker;
8. Less dust in the clinker and exit gases with greater steaming capacity of waste-heat boilers;
9. Reduced maintenance costs.

Individually, any one of these advantageous features of the "blown" kiln would justify its serious consideration by plant operators. Collectively, their value is inestimable and can not justifiably be ignored.

Fuel Saving.—Without going into the intricacies of elaborate calculations it may be said, generally speaking, that the total heat content of a barrel of clinker discharging from the normal kiln represents roughly the equivalent of 15 lb. of an average grade of coal. We can reclaim in practice upwards of 65 per cent. of this amount in the shape of preheat in the combustion air, but this recovery by no means represents the full measure of fuel economy obtained. Better combustion, with higher flame temperature and the production of more "high-grade" heat above the critical value required to produce clinker, will at times double the calculated saving. One plant reports a fuel saving with the "blown" kiln of 23 lb., another 19 lb. per bbl. of clinker produced.

It requires no argument to sustain the statement that the higher the efficiency of the heat exchange between the clinker and the air, the higher the heat recovery and the greater the resultant economy of fuel. Making the heat transfer within the kiln at the point of the maximum temperature differential between the clinker and the air insures maximum efficiency.

External heat exchange—that is, that accomplished outside the kiln—involves serious radiation losses. In the "blown" kiln that portion of the shell comprising the cooling section is thoroughly insulated against heat loss, not only by the incoming cooling air which wipes the shell, but also by the refractory lining. It may be remarked in passing that cumbersome hot-air return flues and hollow bridge-walls, as well as extensive excavation and foundation work, are eliminated.

Cooling.—The initial cooling of the clinker which takes place within the kiln is shown graphically in Fig. 1, which represents good average practice. Referring to the temperature curve, it will be ob-

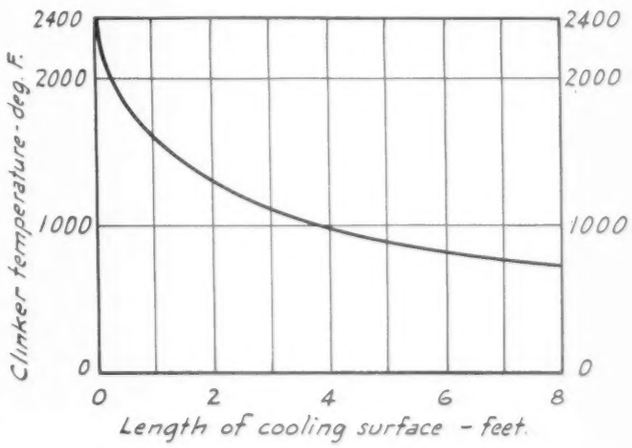


Fig. 1. Curve illustrating initial cooling of clinker in the "blown" kiln.

[1] This term is employed to describe a kiln into which all the secondary air for supporting combustion is blown under pressure through the load immediately prior to its discharge at the end of the shell.

served that the cooling is progressive and that no "reheating" of the clinker takes place.

Cooling, if done with air, when associated with heat recovery from the clinker, must of necessity be carried out in two stages, employing on the first stage the definite volume of air admitted to the

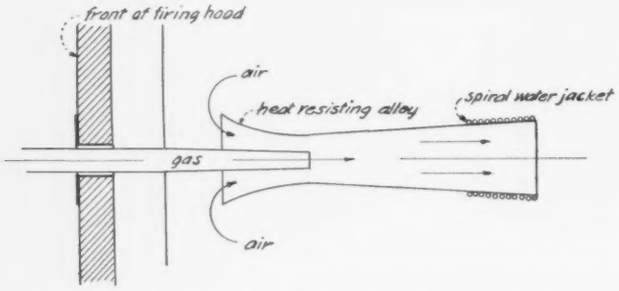


Fig. 2. Suggested design for a blast-pipe of the "inspirating" type.

kiln for combustion purposes and following with second-stage air to complete the cooling. This additional air volume is ordinarily by-passed to the atmosphere, or used for other purposes.

The after-cooler following the "blown" kiln may be of any standard type. It need employ no high-grade heat-resisting metals or expensive refractories as it deals only with clinker having a comparatively low temperature.

In making an installation the existing cooling equipment, if serviceable, is invariably retained. Rotary coolers are very well suited to the purpose of after-cooling, readily carrying the cooling to such a point that the discharged clinker may be handled on a belt-conveyor. The air drawn through these coolers by natural draft may be used in part as preheated primary air, or, as in one plant, it may be employed for drying the coal.

In cases where space limitations preclude the use of long rotaries a short "blown" cooler of this type may be substituted. A "blown" rotary 12 ft. in length will accomplish the same degree of cooling as will one 80 ft. long under natural draft at the same capacity.

Combustion.—Combustion in the "blown" kiln fully meets the essential requirements of the best practice for the highest efficiency, calling for high preheat in the combustion air and high turbulence in the air-fuel mixture with no dilution. It is unnecessary to employ excess air above the theoretical requirement for the fuel in question; in fact, excess air is a positive detriment, as is well understood. A slight excess of, possibly, 2 to 3 per cent. may be permitted simply to insure that combustion is complete. The nature of the air admission under pressure is such that infiltration at the firing hood is effectively cut off, due to the slight pressure maintained at this point.

Combustion under conditions of high preheat naturally results in high flame temperature. Such temperature is not necessarily destructive of the burning-zone lining and it has been found that a high-grade fire-clay refractory stands up well in service.

The primary-air volume for blasting the coal into the kiln need not exceed 20 per cent. of the total combustion-air volume, resulting in a well-placed burning zone of proper length. The blast-pipe may be water-jacketed or air-jacketed as preferred. It will operate for long periods without attention. Blasting velocities, for pulverized coal, as high as 8,000 ft. per min. have been employed successfully.

Gas Burning.—The foregoing remarks apply particularly to the burning of pulverized coal in the kiln. When natural gas is employed as fuel, certain changes in blast-pipe details are necessary, these having to do mainly with gas admission and the mixing of the gas and the air.

Burning methods and blast-pipe design for pulverized coal are practically standardized; however, with natural gas it can not be said that finality of design and methods has been reached in the "blown" kiln, or in the standard kiln for that matter. When we consider, for example, that in normal kiln practice fuel requirements running as high as 2,000,000 B.t.u. per bbl. of clinker produced from slurry have been reported in a kiln 300 ft. long, it appears that further improvement should be made.

The keynote of successful cement burning with heat recovery is the employment of the minimum amount of primary air, which practice is quite contrary to that usually followed in gas firing. Having regard to this important *desideratum*, it might be possible to design a blast-pipe of the "inspirating" type using little or no primary air, along the lines indicated in Fig. 2. The inspirating nozzle has worked for years on cold air, but just

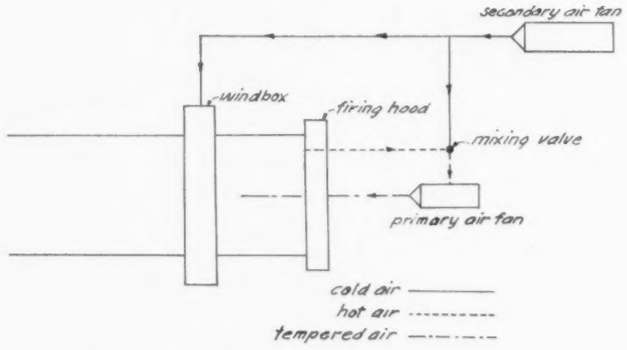


Fig. 3. A simple plan for supplying to the kiln a volume of combustion air properly proportioned to the fuel supply.

how it would perform under conditions of relatively-high preheat is difficult to say without trial.

Steadier Operation and Positive Air Control.—The air application to the "blown" kiln, which is in the nature of a forced draft, not only reduces very considerably the draft requirement at the back-housing, but also assists in maintaining a uniform draft on the kiln as it is not subject to great variations due to atmospheric conditions.

Positive control of the combustion air has, like the weather, been much discussed, but it seems that nobody has done anything about it. The cement industry has come to a realization of the value of the

(Continued on page 36)

Aërial photograph of the operations at Fort Peck looking east. Diversion-tunnel outlets and tunnel contractor's aggregate storage and plant at extreme left. Intake works next stream above upstream trestle on right.

Intake Concrete Plant at Fort Peck Dam Designed for Winter Operation

Contractor Installs Elaborate Conveyor-Belt System for Handling Sand and Gravel

By J. D. JACOBS

THE Fort Peck Dam, although in itself an earth-fill structure, requires more than 1,140,000 cu.yd. of concrete in the construction of its appurtenances. These consist of the four diversion tunnels, totalling more than 25,000 ft. in length, and the two-mile-long spillway channel with its foundations and gates. On the spillway job concreting operations started last summer, 50,000 cu.yd. having been poured to date. The tunnel contractor has been pouring since November of 1934 and at the present writing has placed approximately 187,000 cu.yd. of a total of 500,000 cu.yd. in the completed job. The largest and most complete concreting facilities on the Fort Peck project are those in use on the tunnels, which are described herein. Before proceeding with the mechanical details, however, it may be well to cover briefly the subject of materials.

All the sand, gravel and cement used at Fort Peck is obtained by the government under suppliers' contracts and is delivered to the plants of the project contractors over the government railroad. The contractors are responsible for the unloading and storing of the materials upon their receipt. Washed sand and gravel are shipped a distance of 70 miles via the Great Northern Railway from the pit operated jointly by J. L. Shiely Co.[1] and The Becker County Sand & Gravel Co. at Cole, Mont. The gravel is in two sizes. The fine ranges in size from ¼ in. to ¾ in., the coarse from

[1] See *Concrete Aggregate for Fort Peck Dam Comes From Plant 75 Miles Away* in PIT AND QUARRY, October, 1935, pp. 32-35.

Aggregate stock-piles and reclaiming belt at intake plant.

The 300-ft. inclined conveyor from track hopper to trestle conveyor.

Tripper on aggregate-storage trestle at Fort Peck outlet plant.

The intake concrete-mixing plant before being housed in.

¾ in. to 1½ in. The sand grades from that passing a 100-mesh sieve to ¼ in.

Cement is at present being furnished under contracts with three producers as follows: Ash Grove Lime & Portland Cement Co., Louisville, Neb., 200,000 bbl. in bulk; Universal Atlas Cement Co., Duluth, Minn., 600,000 bbl. in bulk; and Three Forks Portland Cement Co., Trident, Mont., 300,000 bbl. in bulk and 50,000 bbl. in bags. The physical specifications on Fort Peck cement differ from A.S.T.M. standards only in that 90 per cent. must pass a 200-mesh sieve. The chemical qualities are specified to obtain a cement high in sulphate resistivity due to the local problem of alkalinity in ground waters. To obtain this property the aluminum-oxide content is held to a maximum of 6.5 per cent., and the silica to a minimum of 21 per cent. The ratio of aluminum oxide to ferric oxide must be under 2.0, to maintain which the cement mills are adding iron in one form or another to their raw mix. All cement bought is subjected to the Merriman sodium-sulphate resistance test and slabs used in this test must withstand the action of the sulphate for at least 28 days.

The government engineers at Fort Peck maintain a very rigid inspection of all phases of the concreting work and all the mixes are carefully designed to obtain a high-grade concrete. The average compression strength at 28 days runs about 5,000 lb. per sq. in.

Work on the tunnels was begun in May, 1934. The contract is held by Silas Mason, Inc. and the Walsh Construction Co., under the firm name of Mason & Walsh Co. and at present the job is about half completed. The larger of the two mixing plants operated by the tunnel contractors is the one at the outlet works which started producing concrete Nov. 1, 1934. Between that date and March of 1935 it manufactured 50,000 cu.yd., operating through the sever winter weather typical of northeastern Montana. The outlet plant will be the first described.

Since a crowded schedule precluded a winter shut-down, it was primarily necessary to provide large cold-weather storage capacity for sand and gravel. This was accomplished by stock-piling from a timber trestle 630 ft. long elevated on 65-ft. towers. A 30-in. conveyor belt runs the length of the trestle and distributes the sand and gravel by means of a travelling self-propelling tripper equipped with wing belts. The storage piles under the trestle cover an area 700 ft. long and 200 ft. wide and have a capacity of 100,000 cu.yd. of gravel and 80,000 tons of sand, a sufficient supply for 125,000 cu.yd. of concrete. Sand and different sizes of gravel are separated by bulkheads constructed of 2-in. planking. Since the sand and fine gravel arrive with moisture contents up to 6 per cent., steps must be taken to prevent freezing, in order to allow draw-off from the piles in cold weather. This is accomplished by feeding live steam into the piles from the heating plant which will be described later.

Incoming aggregate is discharged from bottom-dump ore cars into a steel track hopper from which it is fed through a Jeffrey-Traylor vibrating feeder to a 300-ft. inclined belt leading to the distributing belt on the trestle. Reclamation from storage is through draw-off hoppers into conveyor tunnels built under the ground surface beneath the piles. Two 700-ft. long 30-in. conveyor belts in these tun-

Outlet portals of diversion tunnels showing tunnel forms and concreting machinery outside entrances.

Contractor's outlet mixing plant and aggregate trestle. Aggregate-heating plant behind railroad trestle at right end of storage. Missouri River in background.

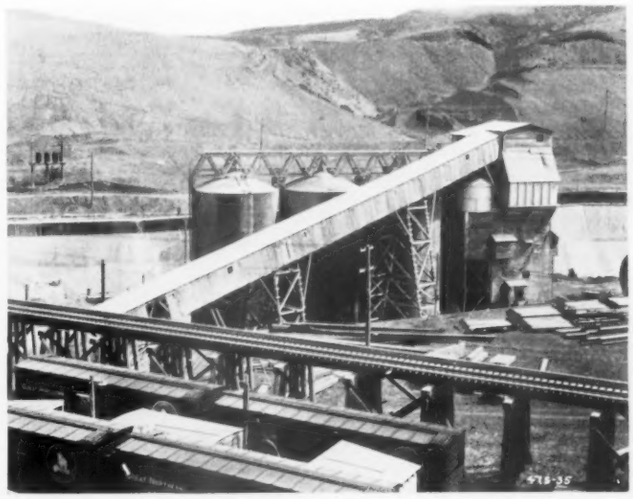
nels are fed through manually-operated gates in the hoppers spaced at 28 ft. for the entire length of the belt. The longitudinal belts drop their material on a cross belt, which carries it up an inclined bridge a distance of 380 ft. to the batching bins in the top of the mixer plant. These bins have a capacity of 440 cu.yd.

All aggregate conveyor belts are 30 in. wide and run over anti-friction carrier and idler rollers. All the conveying machinery was manufactured by the Jeffrey Mfg. Co. and the rubber belting was furnished by the U. S. Rubber Co. Power for the various units is furnished by individual electric motors and is transmitted to the head pulleys through Texrope drives and spur gearing. The electric motors are General Electric throughout. The inclined belts require 40 hp. each, the trestle belt with tripper 30 hp., and the tunnel belts 25 hp. each. The belt speeds are 350 ft. per min. All belts of a series are electrically interlocked to prevent the operation of the feeding belt when the take-off belt is not running. Communication is maintained between the mixing plant and aggregate tunnels with electric-bell signals.

Cement is received in bulk, unloaded from boxcars with Fuller-Kinyon pneumatic pumps and conveyed directly to the storage bins, a distance of 350 ft., through a 51-in. pipe. The cement is stored in three steel silos 30 ft. in diameter and 50 ft. high, located adjacent to the mixing plant. These tanks were furnished by the Chicago Bridge & Iron Works. They were erected in the field, the plates being joined by electric-arc welding. The three tanks form a combined storage volume of 26,000 bbl. of cement. Discharge from the silos is accomplished by means of 12-in. spiral feeders to a 14-in. screw conveyor carrying the material to the boot of a bucket-elevator which lifts it 70 ft. to the 490-bbl. day bin in the top of the plant. Draw-off of the cement is assisted by injecting fine streams of compressed air into the bin bottom hoppers above the gates. From the day-storage bin the cement is taken by a screw conveyor to the batching mechanism. Obermayer electric external vibrators bolted to the batching bin prevent the cement sticking to the sides. All the cement-conveying machinery was furnished by Jeffrey.

The outlet mixing plant was designed for four 2-cu.yd. mixers. Three mixers were installed at the time the plant was built, but one of the three was later moved to the intake plant. With three mixers in operation the plant has produced 2,000 cu.yd. of concrete in a 24-hr. period of continuous operation. The mixers are Ransome type 56-S, horizontal drum non-tilting discharge, powered by 40-hp. General Electric motors.

An interesting feature of the plant's operation is the automatic batching mechanism. The operator starts the batching cycle by pressing the aggregate buttons and tripping the cement-feed lever, whereupon the robot mechanism takes charge of weighing the cement, sand, gravel and water in the required proportions. At the conclusion of the automatic operation the machinery stops and the batch remains in the batching hopper until the operator opens the charging gate to release it into the mixer. The mixing time is 2 minutes and the automatic time locks on the mixers prevent discharge until that time has elapsed. During the weighing operations the weights are indicated on



Cement silos and mixing plant. Gallery houses conveyors from reclaiming conveyors.

South end of storage pile and trestle and heating plant at right.

The aggregate-storage trestle and conveyor from track hopper.

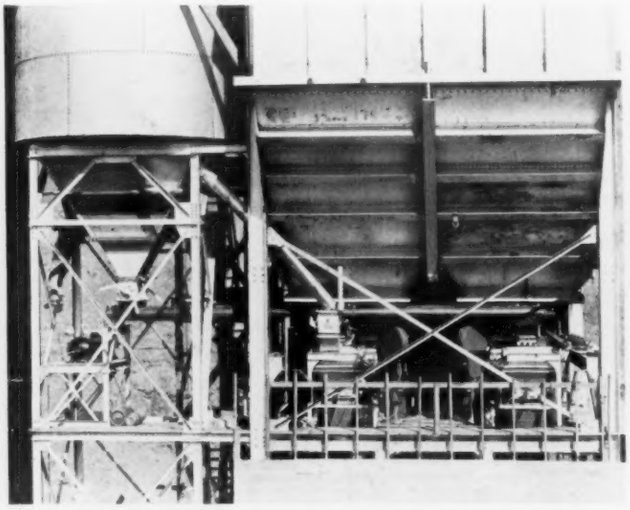
the dials of the Howe scales for convenient check by the operators and inspectors. No pneumatic cylinders are involved in the mechanism. Thrusts are accomplished by direct-geared rack-operated motors on the sand and gravel gates and by General Electric Thrustors on the cement valves. Water is admitted to the weighing tank through a solenoid-operated valve and released through a motor-operated valve. The electric switching system is equipped with Allen-Bradley and General Electric relays, actuated by mercury contact switches. The batching mechanism, as well as the bins and steel plant structure, was designed and built by Blaw-Knox to the specifications of the contractor's engineers.

The outlet plant was built for railroad transportation of the mixed concrete into the tunnels. The haul from the plant to the end of the longest tunnel is approximately 7,500 ft. Narrow-gage tracks from the tunnel portals run into the plant loading shed under the mixers. The concrete is hauled in Blaw-Knox 2-cu.yd. roller-gate bottom-dump buckets on Koppel flat cars, one bucket to a car. The trains consist of two or four cars and are pulled by Goodman electric mine locomotives equipped for storage-battery or trolley operation.

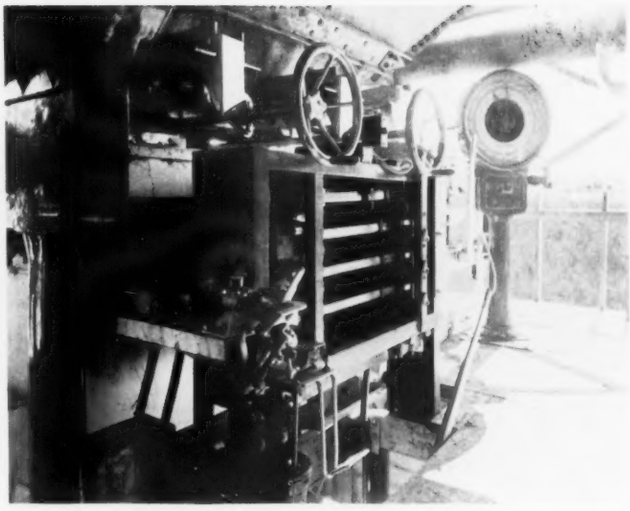
For the purpose of furnishing steam for heating the aggregate stock-piles in winter and also for radiation in the bins of the mixing plant, an unusually elaborate heating system has been installed. The boiler plant is in a separate steel building at the south end of the aggregate stock-piles, a distance of more than 1,000 ft. from the mixing plant. Steam is generated by two 120-hp. oil-field type boilers burning oil as fuel. Heating of the stock-piles is accomplished by admitting live steam directly into the piles through perforated pipes built in frames over the draw-off hoppers. Besides being used for aggregate heating, the steam is used in the contractor's warehouses and shops, and last winter much was used for the outdoor curing of concrete. The boilers were manufactured by the Titusville Iron Works and the heating-plant installation was made by the Municipal Service of Kansas City.

The intake to the diversion tunnels is located approximately a mile upstream from the outlet works. Although the larger portion of the tunnel concrete is to come from the mixers at the outlet, a total of 78,000 cu.yd. must be furnished at the inlet for the portals and trash racks and for a portion of the underground gate-shaft structure. To manufacture this concrete the contractor last summer erected another complete plant at the intake works. This plant is smaller and less elaborate than the one at the outlet. It was not intended for operation in the coldest weather and therefore no large storage and stock-pile heating system has been built there.

Adjacent to the intake plant is a pile railroad trestle, 18 ft. high, from which the sand and gravel are dumped. Parallel to the railroad trestle and 35 ft. out from it runs a conveyor belt, which follows the ground for the length of the stock-piles, approximately 300 ft., and then rises on an incline to the top of the plant. Handling of the aggregates from the stock-pile to the belt and casting for additional storage is done with a Bucyrus-Erie Model



View of the batching floor of the tunnel outlet concrete plant.



The weighing and batching mechanism at the tunnel outlet plant.

43-B Diesel crawler crane with a 60-ft. boom and a 1½-cu.yd. clam-shell bucket. Storage in addition to that available beneath the trestle is obtained by casting the material across the belt to a second pile parallel to the first. Wooden hoppers over the belt facilitate loading with the clam-shell. Cement is unloaded with the same type of equipment as is used at the previously-described outlet plant and is stored in a single steel silo 20 ft. in diameter and 32 ft. high.

The intake plant has two 2-cu.yd. mixers. Batching is semi-automatic, the operator manually controlling the sand and gravel gates. The measurement of the cement and water is automatic. All the machinery and equipment incorporated in the intake plant is of the same make as the corresponding mechanism at the outlet plant.

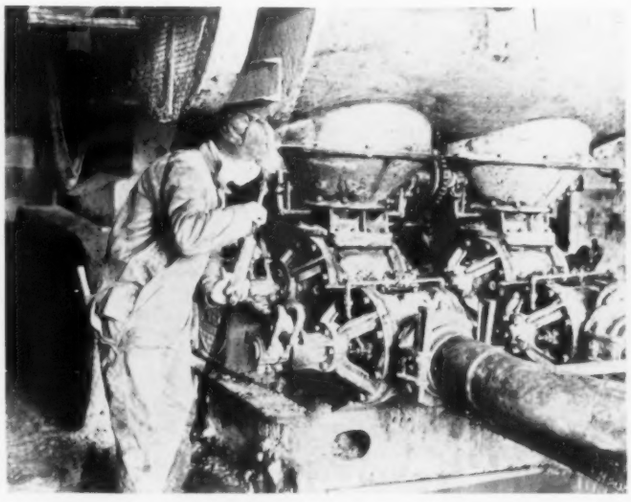
A feature of the intake plant is the Pumpcrete system for conveying the concrete from the mixers to the point of pour. The pumping unit, a Rex dual model 200, manufactured by Chain Belt Co., is installed within the plant housing beneath one of the 2-cu.yd. mixers which discharges directly into it. The concrete is pumped through an 8-in. pipe-line for distances as great as 800 ft. from the mixer. Since the intake plant is situated at an elevation about 40 ft. above the bottom of the intake pit, no appreciable lift is required in the pipeline, making an ideal arrangement for a concrete pump system.

The output from the other mixer of the intake plant is taken away by a shuttle car, with a 2-cu.yd. bucket, which is lowered by means of a hoist and cable system down an inclined track to a hopper over the edge of the intake pit, from which the concrete is discharged into the concrete trains operating into the tunnel portals. Concrete entering the tunnels at the intake is used in the construction of the foundations for the gate shafts, about 2,000 ft. inside the portals.

The Fort Peck project is being built under the supervision of the U. S. Army engineers. Capt. A. W. Pence is in charge of the tunnel construction for the government. For the tunnel contractor, W. A. Durkin is in charge as vice president and general manager, with H. M. Buck as job engineer. E. H. Hatch is general superintendent on the tunnel job with R. D. Budd and T. J. Madigan as concrete superintendents.

The Fort Peck spillway is being built through a natural break in the hills at a point 3½ miles east of the main portion of the dam. Its excavated channel is nearly 10,000 ft. long, 4,800 ft. of which is to be concrete lined. The only concreting as yet under way on the spillway is that involved in the building of the gate structure and approach at the upper end. The contract for this work is held by Addison Miller, Inc. and Fielding & Shepley, Inc. Their mixing plant, started late last summer, will be referred to in the following description as the spillway plant since no other concreting operations have as yet been started on that portion of the project.

The spillway mixing plant is of the same capacity as the tunnel intake plant. Sand and gravel are stocked beneath a pile railroad trestle 50 ft. in height, and reclamation is accomplished by means of a longitudinal center belt in a tunnel beneath the



Pumping machine at tunnel intake plant for conveying concrete by pipe-line to points of pour.

Pneumatic pump used for unloading cement from box-cars to storage-bins.

The straight-line aggregate storage plant erected for work on the spillway. Cement-storage building at right.

pile. The natural storage volume of the pile is increased by bulldozing the aggregates outward with a Caterpillar tractor working on the top of the pile.

Cement is unloaded with Fuller-Kinyon equipment and conveyed pneumatically to the storage bins. These bins, constructed of 2-in. wood planking lined inside with light sheet steel, are in a group of three, each of which is approximately 28 ft. square and 17 ft. high, and furnish 9,000 bbl. of cement storage. The draw-off is to a 10-in. screw conveyor 75 ft. long which runs longitudinally beneath the bin-bottom hoppers. This conveyor discharges into the Fuller-Kinyon pneumatic system which carries the cement to the batching bin.

The spillway aggregate storage and mixing plant is laid out in a symmetrical straight-line arrangement, the railroad trestle, storage pile, reclaiming tunnel and plant all being on a common longitudinal center line. This enables aggregate reclamation to be made directly from the stock-pile into the plant by a single belt. The foundations of the mixing plant rest on the channel bottom, about 40 ft. below the ground level of the stock-piles and cement storage.

The plant is Blaw Knox equipped, with two 2-cu.yd. Smith tilting discharge mixers. The batching is semi-automatic, similar to that in the tunnel intake plant. The principal mechanical difference between the two plants is that the spillway job uses pneumatically-operated gates, electrically-actuated, instead of the direct manual-lever operation which is used in the tunnel intake plant. One operator controls all the batching and mixing operations, with another man on the top floor of the plant attending to aggregate and cement distribution.

The spillway mixing plant and end of aggregate storage set in straight-line arrangement.

The output from the mixers is taken away in Blaw Knox bottom-dump buckets hauled on flat-bed trucks. Placement of the concrete is done with American air control operated crawler cranes equipped with 100-ft. booms.

The spillway construction is under the governmental supervision of Captain J. R. Hardin. H. C. James is in charge of operations for Addison Miller, Inc. and Fielding & Shepley, Inc., with H. Corley as Job Engineer.

Silicosis (from page 22)

abnormal. Under the circumstances it must be assumed that the standard risk for which basic rates are established is for industrial plants in which abnormal hazards are not present and in recognition of this fact the basic rate should be 80 per cent. of that indicated herein for the average before the exclusion of the abnormally hazardous exposure.

Plan II involves an assumption of double the primary benefit costs used in Plan I as an arbitrary method of producing a net premium sufficient to bear the burden of losses exceeding the average cost per claim and as a means of remedying the maladjustment of expense loadings. Reconstructing this rate on the basis of the same factors used in Plan I, and loading the rate sufficiently to defray losses in excess of the amount upon which the assured contributes, would produce a rate of approximately the same amount. As in Plan I, recognition should be given to the fact that plants involving an abnormal hazard will be submitted for surcharge. The

(Continued on page 36)

OCCUPATIONAL DISEASE RATES FOR CLASSIFICATIONS SUBJECT TO DUST HAZARDS AS SUBMITTED BY THE COMPENSATION INSURANCE RATING BOARD OF NEW YORK

Code No.	Classification	Plan I O.D. Rate	Plan II O.D. Rate	Plan II Per-Capita Charge
1164	Mining (n.o.c.)—shafts	$4.63	$1.88	64
1165	Mining (n.o.c.)—surface	2.89	1.18	40
1463	Asphalt works	1.74	.71	24
1604	Quarries—dimension stone	5.21	2.12	72
1605	Rock excavation	5.21	2.12	72
1624	Quarries (n.o.c.)	5.21	2.12	72
1639	Slate splitting	1.16	.47	16
1640	Lime manufacturing	1.74	.71	24
1654	Quarries—cement rock	2.89	1.18	40
1701	Cement manufacturing	1.16	.47	16
1703	Plaster mills	1.74	.71	24
1710	Stone crushing—no quarrying	5.79	2.35	80
1741	Silica grinding	11.58	4.70	160
1745	Soapstone manufacturing	1.16	.47	16
1747	Emery works	3.47	1.41	48
1748	Abrasive-wheel manufacturing	3.47	1.41	48
1852	Asbestos goods (n.o.c.)	6.95	2.82	96
1852	Asbestos goods—molded	3.47	1.41	48
1853	Mica goods manufacturing	1.74	.71	24
1860	Abrasive paper preparation	2.32	.94	32
4000	Sand or gravel digging	1.16	.47	16
4021	Brick or day products manufacturing	2.89	1.18	40
4024	Refractory—products manufacturing	3.47	1.41	48
4034	Concrete products manufacturing	1.16	.47	16
4036	Plaster-board manufacturing	1.16	.47	16
4037	Plaster or staff mixing	1.74	.71	24
5508	Road construction—rock excavation	5.21	2.12	72
6252	Shaft sinking	1.74	.71	24

The Martin Joyce plant, showing tractor, hopper, plant and engine.

Loading finished material from plant into truck. Drive belt at left.

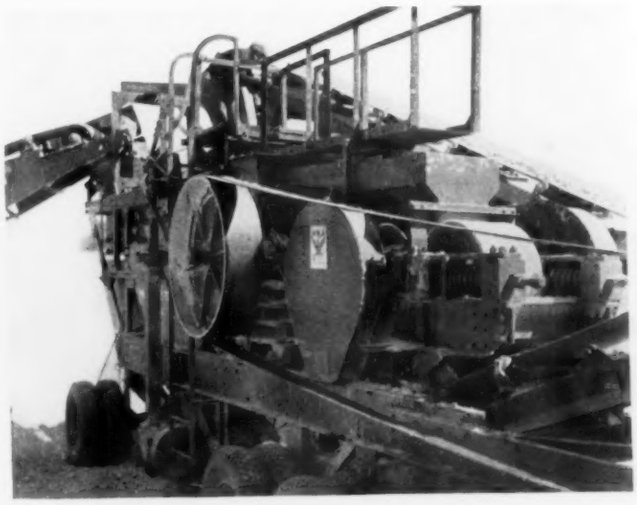
Portable Crushing and Screening Plant Produces 2,200 Cu.Yd. in 13 Hr.

Material Having Clay Content of About 11 Per Cent. Produced for Oiled Roads

A TYPE of aggregate-producing plant which has become an important factor in recent years is the portable operation which is moved from place to place to supply material for secondary roads. One of the pioneers in this field is Martin Joyce of Brandon, S. D. In 1923 Mr. Joyce started to supply pit-run material. As specifications became more exacting for this type of material he purchased and used equipment which enabled him to meet them. In 1932 he purchased an 8-in. by 36-in. portable crusher and a vibrating screen mounted over a portable hopper.

This equipment was used until early in 1935 when Mr. Joyce purchased a Pioneer Duplex Model 12-35 portable crushing and screening plant. This is a strictly portable unit, the entire plant being mounted on 6 dual wheels fitted with Kelly-Springfield pneumatic tires. The only plant equipment not mounted directly on this chassis is the field hopper and conveyor. A 90-hp., 6-cyl., Allis-Chalmers gasoline engine drives the crusher by belt and the other units are driven from this. Material is supplied to the plant by three Allis-Chalmers No. 35 Model K tractors hauling Euclid rotary-dump scrapers. These discharge their contents into a 3-cu.yd. hopper sunk below ground level. A belt-conveyor mounted on a steel frame is supported under the

(Continued on page 34)



Close view of plant, showing roll and jaw crushers, shaker screen and conveyors.

The crawler tractor and scraper hauling gravel to hopper. Conveyor to plant at right.

Safety Congress Discusses Hazards of Dust and Moving Machinery

Education in Safety and the Worker's Attitude Toward Safety Hold Interest

FROM all over America those interested in safety in quarries and cement mills went to Louisville in October for the twenty-fourth annual safety congress of the National Safety Council. They listened to important addresses on safety education, dust hazards, the prevention of injuries from machinery in operation, and what the worker thinks about safety.

J. William Fehnel, chemist for the Industrial Hygiene Laboratory of the Metropolitan Life Insurance Co., New York, spoke on *Dust Hazards in the Quarry Industry.* In addition to drillers, employees working on near operations are often exposed to a high dust concentration generated by the drills, the speaker said. "It is logical, therefore," he continued, "to conclude that the proper way to eliminate dust is to entrap and remove it at the source. While 'wet drilling' may, in certain instances, be effective, the use of water offers other difficulties, especially in freezing weather."

The speaker mentioned the "Kelly trap" as a device which has proved highly effective in allaying the dust hazard both in excavation work and in mining and drilling operations. In a comparative study of wet and dry methods of drilling, it was found that the reduction of dust was ten to one, he said. While this may appear to be a long step toward the solution of the dust problem in drilling, when it is considered that concentrations as high as five and six billion particles of dust are found, reduction to one-tenth of this concentration by wet drilling is insufficient, especially when a considerable amount of free silica is present.

On the basis of studies of underground work in various mining operations and also in open-cut or typical quarrying work it was found that ventilation plays an important part in the control of dust concentration. To a great extent, too, the dust concentrations to which a worker is exposed are dependent upon himself. In few instances is the worker required to remain exposed to a heavy concentration, and then only for a short period of time. It is usually possible for him to work to the windward, so that air currents will carry away the dust clouds. This is particularly true in drilling operations where the drill is of the mounted type. The hazard is greater in the case of hand jackhammer drilling, where the operator is required to bear down with his full weight, bending over the drill to supply the required feed.

On *The Cause and Prevention of Injuries from Machinery in Operation* W. M. Cabannis, assistant superintendent of the Signal Mountain Portland Cement Co., Chattanooga, Tenn., said in part:

In the case of the early guards, and some modern guards, it is easy for maintenance men to leave them off after a repair job and this is done if the maintenance man, operator, foreman or management is not sold on the safety idea. Safety, like water, will not run up hill; therefore, the management must be sold first, then safety will come down the line to the worker. This fact has gained such recognition that to-day safety is as important as any other factor in management. However, it is the practice of safety that prevents accidents and a good operator will refuse to start a machine unless the safety appliances are in place. Since all operators have not yet become impressed with this phase of accident prevention, here lies the cause of the majority of accidents attributed to machinery in operation.

In 1934 approximately 12 per cent. of all lost-time accidents in industry were charged to machinery. In the cement industry 12½ per cent. of all lost-time accidents were charged to machinery in motion, while in the quarrying industry only 5.8 per cent. of its total lost-time accidents were so charged. The causes of these accidents will come under such headings as forgetfulness, neglect, carelessness, lack of good housekeeping, inexperienced operators, etc.

In many plants we find an operator who is anxious to show a good production record but gives very little thought to safety. He will make minor repairs while his machine is in operation successfully for a time, but sooner or later something will slip. One should always stop a machine before reaching into it.

Another common type of accident is caused by trying to put a belt or drive chain on without stopping the motive power. As a rule the victim is an old employee who is reluctant to admit the danger in such practice. With the increase of direct connected units the opportunity for such accidents is being reduced.

A careless workman is a bad risk at best and the habitually careless worker should be weeded out. You may have a safe organization, but with a slight let-down in safety work carelessness will spring up. The best incubator for maturing this bad germ is the lack of good housekeeping. When housekeeping is neglected, habits become sloppy and accidents occur. Good housekeeping breeds safety, curtails waste, and improves *morâle.*

The foregoing causes of accidents can be corrected by safety education. Safety education is not easy to put across due to the vast differences in employees. To some the bulletin board makes a lasting impression; to others this must be supplemented by safety meetings; while to still another group it is necessary that they be the victim of an accident themselves to drive the idea home. A real program requires a set of safety rules that are workable and that will be adhered to. Discipline is essential.

The inexperienced workman is not as dangerous as he was once thought. It is when he has reached the point where he thinks he has mastered the situation that he will bear close watching. Proper training of an understudy is thorough training.

A review of some typical safety education programs was presented by R. H. McFetridge, superintendent, Lehigh Portland Cement Co., Birmingham, Ala., who discussed *The Best Educational Features Used by Ten Cement Plants.* Referring to the plan of the Iola, Kan., plant of the Lehigh company—a plant which has had an unbroken safety record for eight years—he said:

A general safety committee which meets monthly supervises the safety activities through sub-committees composed of the Inspection, Fire, Accident, First Aid and Sanitary, Welfare and Publicity sub-committees. All sub-committee reports are analyzed by the general committee with the plant superintendent as a member.

The Inspection Committee inspects the entire plant regularly. The Fire Committee inspects fire apparatus and housekeeping from the standpoint of fire hazards and conducts fire drills. The Accident Committee investigates accidents to place the responsibility and make recommendations to prevent a recurrence. The First Aid and Sanitary Committee inspects the first-aid equipment and hospital and investigates all sanitary matters. The Welfare Committee supervises all matters pertaining to the welfare of employees and their families. The Publicity Committee supervises bulletin boards, June safety campaigns, contests, picnics, mass meetings and coöperates with safety activities in the community in connection with the schools, home and highway safety.

Twice a year meetings of all employees are held and talks on safe practices are made by the superintendent, foremen, plant physician and "key" men from the rank and file. First-aid and resuscitation demonstrations are made twice a year by employees trained by the United States Bureau of Mines. New bulletins are posted once or twice a week on the bulletin boards and pencilled safety notations are made on a black board. Each foreman instructs new employees as to their duties.

What the Worker Thinks About Safety, an address by Glenn L. Gardiner, of the Forstmann Woolen Co., Passaic, N. J., emphasized the importance of the proper mental attitude toward safety on the part of the employee. Mr. Gardiner said that "what the worker *thinks* determines what he *does*." Excerpts from his speech follow:

If we were to ask a number of people their opinion as to what the worker thinks about safety, we would get an interesting variety of replies. Some would say, "That's just the trouble—the worker doesn't think about safety!" Another reply would be, "The worker is indifferent to the whole subject." Some people believe that the worker feels that "accidents are bound to happen, so why make a fuss about it." The reaction of some would be that the worker thinks, "My own safety is my own lookout, and no one needs to be telling me to watch my step." Others have the opinion that the attitude of the average worker is one of bravado—that the worker thinks, "why be chicken-hearted about the dangers of the job?" Another opinion is that workers have a superstitious attitude toward safety. Workers say, "When it's your time to get knocked off, you just get knocked off. When your number is up, you're just going to get hurt—that, if it's your unlucky day, nothing can prevent an accident." . . .

What the worker thinks about safety rules and regulations depends a great deal upon how strictly safety rules are enforced. No rule is respected if it is not strictly and fairly enforced. The reason that so many workers lose respect for safety rules, is that so often safety rules are not enforced with the same degree of rigidity with which other rules of worker conduct are enforced.

Safety rules must also be sensible and practical if they are to be respected by workers. A fundamental principle to follow is to make no more rules than are absolutely necessary, and then enforce them without compromise. . . . To be thought well of safety rules must be properly "sold" to workers. The reasons back of safety rules should be carefully and thoroughly explained. The worker should clearly understand that the purpose of such rules is to safeguard his life and health. The attitude of the worker's supervisor, and the manner in which he carries out safety rules and standard practices, will determine what the attitude of the worker will be. . . . The foreman must indicate that he himself is sold on safety regulations, or he can not expect his workers to respect them.

It is my opinion that a large proportion of workers think that safety committees are "a lot of eye-wash." Most workers do not want to be bothered by safety committees nor by membership on them. One of the reasons for this is the fact that so many safety committees have been set up and then allowed to die without activity and without accomplishment. With all due respect to our insurance companies writing compensation insurance, their representatives have been responsible in many instances for the attitude of indifference and disrespect on the part of workers toward safety committees. Most of us have had the experience of being called upon by the representative of an insurance company desiring to sell a compensation policy. We have been told that "You can get a certain percentage reduction on your rate if you will set up a safety committee and hold regular meetings of the committee." And often, this statement has been made with a wink which indicates that you can take the safety committee as seriously as you see fit, just so long as you set it up and make it appear to be functioning.

Safety committees can perform a very vital and useful function in any program of accident prevention. It is one of the most difficult safety activities to keep alive and functioning effectively, however. Real work must be given the safety committee to do. Safety committees should have some authority. Their suggestions should be acted upon promptly and thoroughly. No committee, whether it be a safety committee or a committee in a non-industrial organization, will amount to anything unless it has vital work to do, is held responsible for that work, and is given credit for its accomplishment. . . .

A worker thinks nothing about safety posters unless the posters *make him think*. . . . Safety posters are safety advertising and must be judged by advertising standards and the well-understood principles of advertising psychology. There are two time-honored definitions of advertising that may well be considered as applying to safety publicity. The first is that the function of advertising is "*to deliver an unbroken series of favorable impressions*" for a product or an idea. The second is that "*advertising is the art of causing others to KNOW, to REMEMBER and TO DO!*" In short, the job is, with an unbroken series of the right kind of posters, to make the worker *know* safety, *remember* safety *and do* the safe thing always. . . . To be effective, safety posters must appeal to the worker as having a clean-cut, worthwhile safety message in the form of reminder, suggestion, warning, information, or instruction that will help him prevent accidents. The poster that does not capture the attention of workers, enliven their interest, stimulate thinking and action, or aid in developing what we call safety-mindedness might better be consigned to the waste basket. It is not worth posting. . . .

I am quite sure that the average worker does not think enough about first aid. Accident statistics indicate that 15 per cent. of all compensation cases are infection cases. Careless disregard of the importance of first aid on the part of workers is accountable for this large toll exacted by infection.

There are more than 100,000 infection cases annually, causing the loss of a week or more from work. These infection cases cost more than $25,000,000 dollars a year in compensation. So, there can be no question of the importance of reducing infections. The key to reducing this type of injury is the education of workers to think more seriously about the importance of getting first aid treatment of minor injuries which may lead to serious infection.

Why do workers so often neglect first aid? I think that this question has several answers. Many workers just do not want to be bothered about having a slight scratch or cut fixed up. They have had many such slight injuries before and always recovered without serious consequences. Then, some workers do not want to lose time from their jobs to go to get first aid, particularly if they are working on a piece-work basis. Many workers regard it as being "sissy" to go to the trouble of having a slight scratch dressed. Some workers fear that the reporting of these slight injuries may build up a bad record for them. Some workers do not

get first aid attention because they do not want fellow workers to make fun of them for taking seriously so slight an injury. . . .

It seems to me that the real function of a safety engineer is not to attempt personally to prevent all the accidents that happen in the organization. His real function should be that of a safety adviser and helper to get the entire supervisory organization safety-conscious to begin with, and then to help them in various ways to bring this same attitude toward accident prevention to the workers under their supervision. I should prefer to think of the safety engineer as a foremen's "safety follow-up man." The real responsibility for preventing accidents *should be put squarely up to the supervisors themselves.* The safety engineer should function as a helper to them. Their safety suggestions and requisitions should be made to him and then it should be his routine duty to see that these suggestions are carried through promptly and effectively. The safety engineer should serve *the safety needs of the foremen.* . . .

The foreman's safety attitude determines the attitude of his workers toward accident prevention. An indifferent foreman is a *positive menace* and liability to the safety of his men. If he regards safety as a function of secondary importance, then his men will think of safety only when there are not other things to think about. The foreman who does not recognize that safety is the right way of doing a job, has missed the target.

Every foreman should take safety seriously, not only because of the human misery and suffering which he can prevent, but because effective safety work carries with it so many worthwhile by-products. The same efforts which he expends in working up a coöperative attitude in order to prevent accidents can be fruitful in developing coöperation in many other phases of the work of himself and his men.

A company that sponsors and keeps alive an effective accident-prevention program reveals a sincere interest in the welfare of its workers. Do not let anyone tell you that workers do not appreciate such an attitude on the part of the company they work for. . . .

Let us not forget either that what the worker thinks about safety is generally a direct reflection of what the top management thinks, because the attitude there always percolates down through the supervisory staff to the man on the machine or at the bench. When he sees management conscientiously endeavoring to provide safe conditions, safe equipment, and the best obtainable safety devices and protective appliances, together with competent supervision that is ever watchful to prevent accidents, he knows that management is sincere and deserves his hearty coöperation, which he then freely gives.

The Cement Section elected the following executive committee for 1935-36: *General chairman*, D. B. Coleman, Missouri Portland Cement Co., St. Louis, Mo.; *vice-chairman*, Frederick B. Hunt, Nazareth Portland Cement Co., Nazareth, Pa.; *secretary*, A. J. R. Curtis, Portland Cement Assn., Chicago, Ill.; *News Letter editor*, Jack Dempster, Canada Cement Co., Ltd., Port Colborne, Ont., Canada; *Engineering Committee chairman*, William Moeller, Lone Star Cement Co., Dallas, Texas; *Membership Committee chairman*, Henry Reninger, Lehigh Portland Cement Co., Allentown, Pa.; *Poster Committee chairman*, M. P. Greer, Marquette Cement Mfg. Co., Cape Girardeau, Mo.; *Program Committee chairman*, W. J. Worthy, Medusa Portland Cement Co., Toledo, O.

Members at large include R. B. Fortuin, Pennsylvania-Dixie Cement Corp., Nazareth, Pa.; E. Posselt, International Cement Corp., New York, N. Y.; C. E. Ralston, Pittsburgh Plate Glass Co., Pittsburgh, Pa.; F. E. Town, Manitowoc Portland Cement Co., Manitowoc, Wis.; H. Vanderwerp, Medusa Portland Cement Co., Cleveland, Ohio; J. B. Zook, Great Lakes Portland Cement Corp., Buffalo, N. Y.

The following executive committee was elected by the Quarry Section for 1935-36: *General chairman*, A. Foster, Jr., Warner Co., Philadelphia, Pa.; *vice-chairman*, Russell Rarey, Marble Cliff Quarries Co., Columbus, O.; *secretary and News Letter editor*, N. B. Sipe, J. E. Baker Co., York, Pa.; *Poster Committee chairman*, H. F. Yotter, General Crushed Stone Co., Easton, Pa.; *Publicity Committee chairman*, J. R. Boyd, National Crushed Stone Assn., Washington, D. C.; *Statistics Committee chairman*, W. W. Adams, U. S. Bureau of Mines, Washington, D. C.

Members at large are V. P. Ahearn, National Sand & Gravel Assn., Washington, D. C.; William H. Baker, J. E. Baker Co., York, Pa.; O. M. Graves, General Crushed Stone Co., Easton, Pa.; Norman G. Hough, National Lime Assn., Washington, D. C.; and A. L. Worthen, Connecticut Quarries Co., Inc., New Haven, Conn.

Portable Plant (from page 31)

hopper on two rubber-tired wheels. At the head end the conveyor is connected to the plant from which it is driven.

Material is discharged from this conveyor to the lower deck of a double-deck Pioneer shaker screen. The oversize material is discharged into the Pioneer jaw crusher, the product of which is fed by a short belt-conveyor to a return belt-conveyor which discharges to the top deck of the screen. The oversize from this screen goes to a roll crusher, the product of which is returned in the same manner to the screen. The material passing through both decks of this screen drops into a hopper from which it is loaded into trucks by a short belt-conveyor on a suspended steel boom.

At the time of this writing the plant was working a deposit about 25 mi. south of Presho, S. D. Material was being supplied for the resurfacing of 31 mi. of highway between Presho and Jordan, S. D. A total of 20,000 cu.yd. of material was contracted for. Work on this project was begun Sept. 4 and was expected to be completed early in October. A product high in clay content, about 11 per cent., was being produced for oiled roads. All the finished product must be under 1 in. in size. The deposit contains about 10 per cent. of material larger than 1 in.

The plant is rated at 80 cu.yd. per hr. by the makers when crushing a high percentage of the material. Under the conditions at this location as much as 2,200 cu.yd. has been produced in 13 hr. The capacity was held down to some extent by the presence of occasional clay pockets in the deposit which had to be scooped out, causing an irregular feed to the plant. A maximum of 30 trucks were hired to haul the finished material, the number varying with the length of haul.

The kiln, the incline from the quarry and the limestone plant.

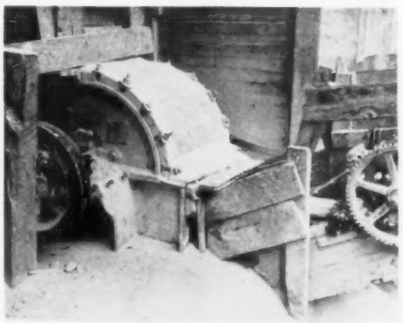
A view in the quarry, showing car being loaded by hand.

Lime Manufacturer in Florida Divides Processes Between Two Plants

Quicklime and Lime Rock Are Produced at One and Hydrated Lime at the Other

THE Florida Lime Co., Inc., Ocala, Fla., one of the oldest producers of lime and limerock in the Southeast, has an unusual plant arrangement for the production of various materials. It operates two plants in Ocala known as Plants 1 and 2. Plant 2 was originally built in 1903 for the production of limerock and lump lime and is now used for those purposes. Plant 1 was built in 1926 for the production of quicklime and several types of hydrated lime. This plant burned down in June, 1931, and was completely rebuilt in 1932. The single vertical kiln has not been used since the fire, however, and quicklime and limerock are hauled by truck from Plant 2 for grinding and hydrating. Quarry 1 was abandoned some years ago when the supply of suitable rock was exhausted.

Quarry 2 is worked in the same manner as other similar operations in the Southeast. A Koehring



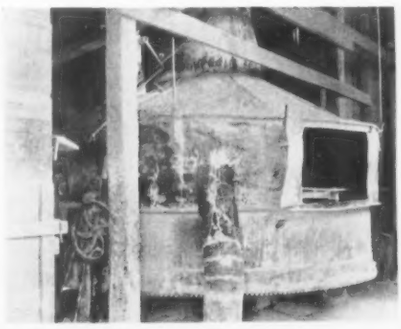
Top left.—Hammer-mill in limestone-pulverizing plant which discharges to drag-conveyor at right.

Bottom left.—Pulverizer in lime plant with pipe to cyclone at left.

Top right.—Batch hydrator in lime plant at Plant No. 1.

Bottom right.—Hand spout packer with scale which supplements automatic packer.

Below.—The gyratory crusher which reduces lump lime before it is fed to the hydrator.



drag-line removes overburden from the deposit. Hand drills and 40-per cent. explosives are used. Ocala Iron Works 1-cu.yd. steel quarry cars are loaded by hand and pushed to a turntable. A hoist driven by a 15-hp. G.E. motor hauls the cars up an incline, at the top of which the rock is dumped over a grizzly into the feed bin of the single vertical brick kiln. The kiln shaft is circular at the top, tapering to square at the bottom with a constant inside diameter of 5 ft. and is 18 ft. high. Pine, oak and other kinds of wood are used for firing and the kiln produces about 4½ tons of lime daily. The burned lime is then loaded by hand into barrels for haulage to Plant 1, although some lump lime is shipped from this plant.

The fine material which passes through the grizzly is fed to a Jeffrey hammer-mill and the product is reclaimed by a drag-conveyor and then loaded by hand into cars for shipment as agricultural limestone.

At Plant 1 the lump lime is dumped on a picking floor where the spalls are removed. It is then fed to a Sturtevant rotary crusher which discharges its product into a small bin. A bucket-elevator feeds a batcher which is set to weigh batches of 1,200 lb. to the Clyde batch hydrator. About 20 min. is required for complete hydration of the lime, which is thereafter discharged into a small bin. This feeds an O. B. Wyse Size 20 pulverizer connected to a cyclone. The coarse material from the cyclone is fed to a Tyler Hum-mer screen. The oversize is fed back to the pulverizer and the fines go to a bin feeding a 2-spout Valve Bag Co. packer. A second type of hydrated lime is stored in a separate bin and is fed to a Utility sacking scale. The entire plant is belt-driven from a 30-hp. Fairbanks-Morse electric motor.

"Blown" Kiln (from page 24)

unit coal pulverizer which dries the coal as it grinds. The customary practice with these units of withdrawing preheated air from the kiln for drying and primary purposes is of great advantage in the "blown" kiln, reducing the initial primary requirement, and may be followed in principle even where unit pulverizers are not available.

In Fig. 3 there is shown a simple and convenient method of supplying a constant volume of air to the kiln or, what is more important, a volume of combustion air properly proportioned to the fuel supply and varying with it. Here the secondary-air fan is placed under automatic volume regulation and the primary-air supply is taken off the kiln and the secondary-air duct. Regardless of any changes the operator may make in the primary-air volume from time to time, the total volume remains constant. It is only necessary, therefore, to interconnect the fuel feed with the secondary-air volume control and place the kiln under draft regulation to insure a uniform air supply for any given fuel requirements.

Quality and Grindability.—The clinker produced in the "blown" kiln is hard-burned and vitreous. It possesses a greater specific density than the normal product, is practically dustless, and is free of contamination by underburned material. The free-lime content is greatly reduced, in some cases this constituent being entirely eliminated. Strengths of standard cements ground from this clinker are in some instances higher in respect to 24-hr., 3-day and 7-day breaks than high-early-strength cement made in the normal kiln.

It is established beyond question of doubt that air-quenched clinker is more readily ground than is the slowly-cooled product. Air-quenching, however, serves no useful purpose, in so far as grindability is concerned, when carried beyond the temperature at which the clinker reaches the black stage, as has been conclusively proved by tests.

Having established this fact, we do not necessarily jump to the further conclusion that external air-quenching equals that of the "blown" kiln. Here again, temperature comes into play and it is logical to conclude that air-quenching at practically burning-zone temperature must exert a more pronounced influence than is the case when the clinker undergoes an initial chill before the air-blast is applied.

Dusting.—Greatly reduced dust losses in both the clinker and the exit gases are a matter of considerable importance from the monetary standpoint as well as plant cleanliness. A reduced dust burden in the flue gases is of benefit in the steaming capacity of waste-heat boilers. Both operation and tests confirm the fact that boiler outputs with the "blown" kiln are augmented with no appreciable increase in kiln exit-gas temperatures, operators ascribing this to the lessened dust deposit on boiler tubes.

Maintenance Costs.—No particular comment on this subject is necessary. It is obvious that the maintenance of coolers, drags and elevators must be greatly lowered when handling clinker discharging from the kiln at a moderate temperature as compared to a high-temperature product.

It may be added that the great advantage in handling a thoroughly-cooled product carries even further, obviating the use of the objectionable water spray on elevators and drags and on the shells of compartment mills and tube mills.

Silicosis (from page 30)

basic rate after recognition of this fact, by a discount of 20 per cent. from that proposed by the board, should be $1.88.

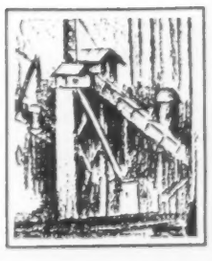
Risks involving abnormal hazard of exposure to dust diseases will be submitted to the Compensation Insurance Rating Board for consideration of a supplemental rating which after determination by the board will be submitted to the superintendent for approval. Similarly, assureds whose processes, although classified as in the dust-disease group, involve a non-existent hazard should be submitted to the rating board for removal of the charge for the dust-disease hazard. The Superintendent will make a further review of the approved rates by November 16.

The proposed rates are shown in the table on page 30.

MEN OF THE INDUSTRY

TH. AVNSOE

TH. AVNSOE, vice-president of the International Cement Corp., New York, was educated in the technical schools of Copenhagen. He began his long career in the cement industry when he joined the organization of F. L. Smidth & Co., cement-mill machinery makers of Denmark. He was connected with this company both in Europe and the United States. Mr. Avnsoe has been with the International Cement Corp. since its inception, occupying various positions throughout the mill organization. As vice-president of the company he has charge of the Lone Star cement plants in the United States and Cuba, all subsidiaries of the International company. At various times he has held important positions in connection with the technical committees of the Portland Cement Assn.



Personal Mention

Frank J. Rief, purchasing agent for the Chicago district of the newly formed Carnegie-Illinois Steel Corp., has been appointed general purchasing agent for the Universal Atlas Cement Co., Chicago, Ill., to take effect Nov. 1. He will succeed W. H. Dutcher, purchasing agent, who has been with the cement company for over 30 years and who asked to be relieved of his duties. Mr. Dutcher has made application for a pension under the steel corporation's plan. Mr. Rief has been connected with the Corporation for 23 years, beginning his work at the South Chicago plant of the Illinois Steel Co. In 1916 he was transferred to the Chicago office, in 1918 was appointed buyer, in 1924 assistant purchasing agent, and in 1930 purchasing agent.

Dr. Gerald F. Loughlin became chief geologist of the United States Geological Survey, Washington, D. C., effective Oct. 1, succeeding Dr. Timothy W. Stanton, who has been retained in the service several years past retirement age through special Presidential exemption and who has been chief geologist since Feb. 1, 1932. After some years of teaching Dr. Loughlin entered the Geological Survey in 1912, and has subsequently served as geologist in charge, Division of Mineral Resources, and as geologist in charge, Section of Metalliferous Deposits. His own work has been principally in various phases of economic geology.

Robert B. Frost, who has been assistant plant manager of the Hudson, N. Y., plant of the Lone Star Cement Co. New York, Inc., for the past six years, has resigned to become plant manager of the Bakerton, W. Va., plant of the Standard Lime & Stone Co., effective Nov. 1.

A. E. Dickinson of Chicago, president of the Indiana Limestone Corp., has resigned to become chairman of the board, where he will act in an advisory capacity. Mr. Dickinson, who has been in the stone business for fifty years, has been seeking release from the heavy duties of the president's office. His successor probably will not be elected before the annual meeting in February. **L. E. Donaldson** of Bedford, Ind., has been appointed acting general manager until the meeting.

Otto F. Schulzke, who has been with the Missouri Portland Cement Co. for 26 years, has been appointed to fill the vacancy made by the resignation of V. K. Newcomer, resident manager of the Cement City plant. **C. E. Phillips** has been appointed superintendent of the St. Louis plant to fill the position formerly held by Mr. Schulzke.

J. C. Van Doorn, sales manager, Universal Atlas Cement Co., Minneapolis, Minn., has ended a service of nearly a third of a century with this company by his recent retirement. He began his work in 1903 as sales agent in St. Louis, the company at that time being the cement department of the Illinois Steel Co. In 1907 he was made northwestern sales manager, Minneapolis, and in 1928 sales manager. **D. S. Day,** who has been with the Universal Atlas Co. for 28 years, former assistant sales manager, will succeed Mr. Van Doorn.

Dwight Morgan, vice-president and manager of the Lone Star Cement Co., Norfolk, Va., has been elected to the board of directors of the Virginia Manufacturers' Assn. This association recently went on record as being opposed to the processing tax imposed by the Federal government and signified its intention of fighting its collection through the courts.

Clarence B. Randall, president of the Inland Lime & Stone Co., Chicago, Ill., has been elected a director of the Inland Steel Co. Mr. Randall is also an officer of other Inland Steel subsidiaries.

John West was presented with a silver medal on Sept. 25, in recognition of 25 years of service with the Universal Atlas Cement Co., Hudson, N. Y.

F. C. Morey has been appointed Chief Engineer of the Parsons Engineering Corp., Cleveland, O., and has also been elected to the board of directors of his company. For the past several years Mr. Morey, who has been with the Parsons company for more than seven years, has devoted considerable time to the study of dust-collecting equipment as applied to cement-mill operation. He is a graduate of the Case School of Applied Science and, prior to coming with Parsons, was with the American Blower Co.

Ray F. Schneider has been elected to the presidency of the Williams Patent Crusher & Pulv. Co., St. Louis, Mo., after an association of 20 years as estimator, assistant superintendent, and advertising manager. All this time has been spent with the Williams company with the exception of about two years in the army during the World War.

A. W. Robinson, for many years connected with Oliver United Filters, Inc., as a sales engineer specializing on the cement industry, has joined the Western Precipitation Co. of Los Angeles, Cal. This concern makes the equipment used by the Cottrell process of electrical precipitation in dust collection.

Coming Events

November 13-15, 1935, Vancouver, B. C., Canada. Annual Western Meeting Canadian Institute of Mining and Metallurgy at the Hotel Vancouver.

November 12-15, 1935, Cleveland, O. 36th Annual Convention, International Acetylene Assn. at the Hotel Cleveland.

December 2-7, 1935, New York, N. Y.—Exposition of Chemical Industries.

December 5 and 6, 1935, Washington, D. C.—Fifteenth annual meeting of the Highway Research Board of the National Research Council. Roy W. Crum, director, 2101 Constitution Av., Washington, D. C.

December 9-12, 1935, Miami, Fla.—Annual convention, American Assn. of State Highway Officials.

January 18-24, 1936. Cleveland, O. Annual Road Show, American Road Builders' Assn. at the Exhibition Hall.

January 27-30, 1936. St. Louis, Mo. Concurrent annual conventions of the National Crushed Stone Assn., the National Sand & Gravel Assn. and the National Slag Assn. at Hotel Jefferson.

February 25-28, 1936, Wichita, Kans.—Ninth Annual Southwest Road Show and School, Exposition Bldg.

Obituary

Rufus C. Brown, 87, president of the Cook & Brown Lime Co., Oshkosh, Wis., died September 10, following a heart attack. Mr. Brown was born in Belvidere, Ill., and brought his family to Oshkosh by steamboat in 1858.

Chas. S. McNeal, Hinsdale, Ill., former president of the Garden City Sand Co. of Chicago, passed away on September 1. Mr. McNeal, who was 62 years old, was born in Chicago, but had resided in Hinsdale for the last 39 years.

John C. Row, 65, well-known business man and stone-quarry owner, died at Batesville, Ind., Oct. 5.

Robert P. Peebles, chief engineer of the Castalia Portland Cement Co., Pittsburgh, Pa., passed away Sept. 4. Mr. Peebles had been connected with his company for 17 years.

NEW CORPORATIONS

Roman Gypsum & Cement Corp. has been chartered in Reno, Nev., with a capital of $100,000. The directors are Edward Adelseck, Homer Brunell and George S. Green, all of Reno.

Western Rock Products Co., Inc., has been chartered in Los Angeles, Cal., by E. Cetto, T. Burke and D. Richmond, all of Los Angeles.

West Farmington Washed Gravel Co. has been chartered in Detroit, Mich., with a capital of $20,000, of which $6,200 has been paid in, and is located at 7332 West Seven Mile Road.

Albion Vein Slate Co., Pen Argyl, Pa., plans erection of blackboard mill to replace the mill destroyed by fire. The expenditure will be about $30,000.

Coastal Sulphur Co., San Antonio, Tex. Capital stock $250,000. To engage in mining.

Fort Bend Sand & Gravel Co., Houston, Tex. Capital $1,000. Incorporators are M. W. Kennon, R. W. Rogers, T. L. Bauer. Organized to develop sand, gravel and rock pits in the vicinity of the Brazos River.

Oklahoma Lime Products, Inc., Tulsa, Okla. Capital $2,000. Incorporators are J. Harold Adkison, Clark R. Davis and Herman V. Irey.

Sterling Mica Mines, Inc., Boston, Mass. Capital $25,000—250 shares at $100 each. Incorporators are Earle B. Boss, Billerca, Mass.; Ralph L. Loomis, Bedford, Mass., and Dorothy A. Mack, Boston, Mass.

Superior Stone Co., 165 W. Wacker Drive, Chicago, Ill. Capital 25,000 shares n.p.v. common. Incorporators are W. P. Hodgkins, P. H. Kelly and Marshall G. Sampsell. To deal in sand, gravel, stone, rocks and clays.

Foreign Developments

Researches on Cements in Corrosive Solutions

A series of investigations of the resistance of various cements in corrosive solutions is reported by Dr. W. Wittekind in *Tonindustrie-Zeitung*. The basic principles underlying the tests (with the intention of modernizing many of the results of earlier studies on the same subject) were that the concrete mix and the consistency of the mortar should be the same in the cases of all cements and correspond to practical conditions; that the corrosive solutions should not exceed essentially the concentrations occuring in nature; that all measurements should be made with analytical exactness; that there should be no secondary influences on the various sorts of cement; that the temperature and other influences should be constant throughout the investigations, and that swelling and shrinkage should be easily measurable.

Tests were made with Portland cement, high-strength Portland, 30/70 Rhine trass cement, 50/50 Rhine trass cement, iron-Portland cement, blast-furnace cement and fused aluminous cement (*ciment fondu*). The solutions employed were distilled water, ½ per cent. $MgSO_4$ solution, ½ per cent. Na_2SO_4 solution, ½ per cent. $(NH_4)_2SO_4$ solution, ½ per cent. $MgCl_2$ solution, and saturated gypsum solution. The results are presented and compared by means of charts.

The main article is preceded by a review of the literature on the subject. *Tonindustrie-Zeitung* 59:584-586, 594-596, 677-678, 690-693, June 17 and 20, July 15 and 18, 1935.

Innovations in Kiln Equipment Reviewed

An article in *Zement* for June 27, 1935 (395-398) by Dr. H. Jordan reviews, on the basis of pertinent German patents issued, innovations during the year 1934 in the burning of cement in shaft kilns and on grate devices. Discussed in the review are German patents No. 597,103, an addition to basic patent No. 577,616, providing for the enriching of the air of combustion in a shaft kiln by means of oxygen; No. 597,321, also an addition to No. 577,616, providing for the burning of Portland or fused cement from very coarsely ground raw material, the air being blown in at high pressure; No. 602,085, for regulating the operation of a shaft kiln for cement and similar materials; No. 595,131, a raw material feeder for shaft kiln to eliminate the outbreaking of fire around the charging opening; No. 598,533, a device for feeding raw materials to a shaft kiln distributed by size with the fine particles at the edge of the kiln; No. 592,-259, an addition to and improvement of basic patent No. 553,485, a drawing device; No. 577,103, a sintering grate for cement and other materials; No. 595,184, a grate providing for constant agitation of the raw material on the grate to achieve uniform burning; No. 600,084, an addition to 567,531, for preheating on a sintering grate of bituminous limestones and similar materials from which under the basic patent hydraulic cement is produced; No. 606,731, a sintering grate with multiple feeds and increased contact of the blast with the raw material.

Synthesis of Hydrates of Calcium Silicates

In the study of the formation of crystallized hydrates of calcium silicates reported here, the compounds $3CaO.SiO_2$, $2CaO.SiO_2$ and $CaO.SiO_2$ were produced from stoichioemetric mixes of freshly ignited CaO and pure precipitated silica, heated to 1,400 deg. C., pulverized and again heated until the White and Emley tests showed no free lime, mixed with water, and heated by appropriate methods to varying temperatures. The resulting compounds were dried, then investigated by chemical, optical and X-ray tests.

The results were in general that the Wollastonite was not altered by this hydrothermal treatment, but the dicalcium silicate yielded Hillebrandite and the tricalcium silicate yielded a mixture of Hillebrandite and calcium hydroxide. These results seem in opposition to the data of Nagai, who concluded on heating CaO and quartz meal in a molar relation of 2:1 at 150 to 200 deg. C. that he found mainly Afwillite, $3CaO.2SiO_2.3H_2O$, while Hillebrandite was formed only in the presence of a large excess of CaO. In the authors' observations the Wollastonite did not hydrate, while Nagai obtained Xonotlite, $CaO.SiO_2.0.25H_2O$ from CaO and quartz meal in a molar relation of 1:1. The authors verified the latter datum by repeating Nagai's experiment, establishing the interesting fact that the hydrate of Wollastonite can be produced not from Wollastonite but synthetically. On the other hand, the authors obtained very fluctuating results on heating an excess of CaO with SiO, either quartz meal or precipitated silica. In some preparations Xonotlite was determined, in others Hillebrandite and in others Hillebrandite along with calcium hydroxide, as well as an unknown crystal form with a refraction index of 1.600, not corresponding in any essential with Afwillite.

The hydrothermal treatment of dicalcium and tricalcium silicates yielded Hillebrandite beyond question. Whether the reactions

$$3CaO.SiO_2 + 2H_2O = 2CaO.SiO_2.H_2O + Ca(OH)_2$$

and

$$2CaO.SiO_2 + H_2O = 2CaO.SiO_2.H_2O$$

take place at ordinary temperature, and so in the hardening of cement, with the difference that instead of the crystalline an amorphous product is formed, which in the course of time is converted to Hillebrandite, must be determined by further investigations. —Wilhelm Köhler, in *Tonindustrie-Zeitung* 59:739-740, 754-756, August 1 and 5, 1935.

First Hardening Better at Lower Temperature

Temperature has an important effect on the formation of cement gel in hydration and on the beginning of hardening. The progressive hydration from the outer surface to the interior of the particle is more vigorous at the lower temperatures, down to 2 deg. C., for example. As the formation of calcium-silicate gel at lower temperatures requires a longer period of time, the inception of the separating-out of crystals and intensive hardening is retarded and a better utilization of the hydraulic properties of the cement is attained. In case the gel is formed at higher temperatures the gel at the surface of the particle hardens much more rapidly, and in certain cases the water in the concrete is not sufficient for the complete hydration of the cement and the attainment of the highest possible strength.

According to studies reported in *Stroitelnaya Promyshlennost*, a violent swelling of the gel takes place during freezing and thawing, accompanied by a supersaturation of the gelatinous gel and retarded hardening, although while actually frozen there is no general decomposition of the particle. In a series of mortars tested at an age of 0 to 6 hrs. after freezing, increases of as much as 50 per cent. in strength, as compared with mortars handled in the usual way, were observed.

On these considerations the idea that current should be passed through the concrete in electrically heating it or that storage be started in steam is wrong. Concrete should in any case be given a chance to harden for 24 hrs. at temperatures of from 15 to 25 deg. C., and at still lower temperatures, which is more desirable, not less than 36 hrs. Also, the accelerated test method in the laboratory must be modified in the sense of postponing the start of warming.—Dipl.-Ing. Mironoff in *Zement* 24:521, Aug. 22, 1935.

Aggregates Statistics*

REFLECTING increased production of sand and gravel in 1934, employment at commercial operations in the United States showed a gain of about 5 per cent. over 1933, judging from data covering approximately three-fourths of the industry. Actual man-hours of employment apparently increased about 6 per cent. and the average output per man-hour advanced from 2.8 short tons in 1933 to 3.0 tons in 1934.

In the canvass for 1933 the Bureau of Mines for the first time asked operators to report data on employment. Three questions were included on the schedule: The average number of men employed during the year, the number of days in operation, and the length of the working day. This inquiry was continued in 1934, and complete replies were received from producers accounting for 78 per cent. of the total commercial production.

The accompanying table shows employment—men, man-shifts, and man-hours—as calculated from information furnished by the operators. The average number of days of operation and the average length of shift have been calculated from these data. The quantity of sand and gravel produced by the companies reporting employment data is shown in the table, as well as the percentage of the total commercial production accounted for in each district, and, finally, the output per man-shift and per man-hour have been computed.

* By H. H. Hughes and M. A. Cornthwaite, U. S. Bureau of Mines.

Employment in 1934 at sand and gravel plants included in the study amounted to 14,611 men and these men produced 59,018,238 short tons of sand and gravel, 78 per cent. of the total commercial output. The apparent total employment, therefore, was approximately 18,600 men. The average employee in 1934 worked 168 days and 8.1 hr. per day compared with 155 days and 8.7 hr. per day in 1933. The output per man-hour varied from 1.9 tons in N. R. A. Code Region 4 to 3.8 tons in Regions 2 and 11. The figure of 12.4 tons per man-hr. for Region 14 is considerably above that for any other region due to the highly mechanized sand-and-gravel operations at Boulder Dam. The higher average output per man-hour in 1934 in most regions no doubt reflects greater operating economy made possible through increased production schedules.

Machinery Makers Meet for Dinner in New York

After an interval of two years members of the Manufacturers' Divisions of the National Crushed Stone and National Sand & Gravel associations met in the New Yorker Hotel in New York on the evening of October 25 to resume their annual dinners. Plans for the coming joint exposition at St. Louis in January were presented and discussed. Approximately 75 manufacturers, producers, association executives and members of the press were present. PIT AND QUARRY was represented by W. A. Buschman, eastern advertising manager.

Highway Research Board Meets on December 4-5

The Fifteenth Annual Meeting of the Highway Research Board will be held in Washington, D. C., at the National Academy of Sciences and National Research Council on Dec. 5 and 6, 1935. The preliminary list of topics to be discussed includes highway transportation economics, highway design, materials and construction, maintenance, traffic and safety, and soils investigations.

Cleveland Road Show Needs Extra Building

When the Joint Exhibit Committee of the American Road Builders' Assn. met on Oct. 24 to allot space for the 1936 Road Show at Cleveland, it found that the number and size of applications for space were so great that it was necessary to provide an additional area for exhibit space. This requires some change in the floor lay-out and a new entrance will be used. A revised floor diagram will be sent to all exhibitors in order that they may make whatever changes are necessary. The new date set for allocation of space is Nov. 13.

The Green Bag Cement Co. of Kenova, W. Va., has sold three of its steel barges to the Blaske Boat & Barge Co. of Alton, Ill., for transporting cement used in the building of locks and dams on the upper Mississippi River.

EMPLOYMENT IN THE COMMERCIAL SAND-AND-GRAVEL INDUSTRY, SAND-AND-GRAVEL PRODUCED AT PLANTS INCLUDED IN THE STUDY, AND AVERAGE OUTPUT PER MAN IN THE UNITED STATES, 1934, BY REGIONS[1]

Region (N. R. A. Code)	Employment					Production			Percentage of Commercial Industry Represented
	Average Number of Men	Time Employed		Man-hours		Commercial Sand-and-Gravel (*short ton*)	Average per Man (*short ton*)		
		Average Number of Days	Total Man-shifts	Average per Man per Day	Total		Per Shift	Per Hour	
1. Maine, New Hampshire, Vermont, Rhode Island, Massachusetts, and Connecticut	457	143	65,242	8.2	533,885	1,651,150	25.3	3.1	74.5
2. New York	818	151	123,677	8.0	993,910	3,773,058	30.5	3.8	53.4
3. Pennsylvania, New Jersey, and Delaware	2,135	176	376,723	8.2	3,082,725	6,818,635	18.1	2.2	94.2
4. West Virginia, Virginia, Maryland, and District of Columbia	934	257	239,847	8.3	1,987,890	3,720,733	15.5	1.9	76.0
5. South Carolina, Georgia, Alabama, Florida, and Mississippi	414	157	64,797	8.3	540,903	1,378,395	21.3	2.5	64.5
6. North Carolina, Kentucky, and Tennessee	673	177	119,103	8.3	987,834	2,117,790	17.8	2.1	85.3
7. Arkansas, Louisiana, and Texas	1,374	181	248,198	8.3	2,049,934	4,374,084	17.6	2.1	81.6
8. Ohio	1,261	174	219,932	8.2	1,804,046	4,092,787	18.6	2.3	83.2
9. Illinois and Indiana	1,671	168	280,439	8.2	2,313,523	8,024,545	28.6	3.5	89.9
10. Michigan and Wisconsin	1,042	129	134,628	8.6	1,158,209	4,829,404	35.9	4.2	77.8
11. North Dakota, South Dakota, and Minnesota	447	113	50,326	8.2	413,276	1,590,387	31.6	3.8	60.2
12. Nebraska and Iowa	785	112	87,600	8.4	731,843	2,655,985	30.3	3.6	85.6
13. Kansas, Missouri, and Oklahoma	713	168	120,098	7.7	924,266	2,987,338	24.9	3.2	80.9
14. Wyoming, Colorado, New Mexico, Utah, and Arizona	256	174	44,628	7.9	352,712	4,368,253	97.9	12.4	90.7
15. California and Nevada	824	192	157,986	7.7	1,213,798	4,349,785	27.5	3.6	78.9
16. Montana, Washington, Oregon and Idaho	807	148	119,611	6.8	808,879	2,285,909	19.1	2.8	55.7
Total United States, 1934	14,611	168	2,452,835	8.1	19,897,633	59,018,238	24.1	3.0	78.4
Total United States, 1933	12,536	155	1,947,225	8.7	16,937,862	47,215,123	24.2	2.8	71.4

[1] Does not include plants operated by or directly for states, counties, municipalities, and other government agencies.

Traffic News and Comment

Recent I. C. C. Decisions

Cement.—In response to fourth-section application No. 15,144, the carriers have been authorized to establish rates on cement from points in central and trunk-line territories, rates to destinations in West Virginia without observing the long- and short-haul provision of Sec. 4, subject to the usual circuity limitations. The rate basis to be used in constructing these rates to all points except those on branch lines of the C. & O. north and south of the main line from Hinton to Kenova, W. Va., is the distance scale of rates prescribed in Southern Cement Rates, 132 I. C. C. 427, supplemented in 139 I. C. C. 484, 147 I. C. C. 303, 155 I. C. C. 339, 176 I. C. C. 747, and 188 I. C. C. 602. To the branch-line points the rates to main-line junction points made on a basis of the distance scale prescribed in Atlas Portland Cement Co. *v.* C. B. & Q., 84 I. C. C. 1 and 83 I. C. C. 80, are to be observed as the minima. The car-load minimum weight is 50,000 lb. and applies on cement in straight or mixed cars with cement mixture (consisting of cement and common sand, in boxes).—F. S. O. No. 12,041.

Pulverized Limestone.—In response to fourth-section application No. 15,909 the carriers have been given authority to establish and maintain rates on unburned, ground and pulverized limestone from Buckeystown, Eagles Mills, Fredrick, Grove, Keller, Lime Kiln, and Security, Md., Capon Road, Cedar Creek, Middletown, Oranda, Stephens City, Vauclause and Winchester, Va., Alba-Marl Lime Co., Charles Town, Engle, Kearneyville, Martinsburg, Millville, Natural Lime-Marl Co.'s Siding, W. Va., to destinations in North Carolina without observing the long- and short-haul provision of Sec. 4, subject to the usual circuity limitations. The rates to be used are the lowest rates on like traffic over any line or route between the same points constructed on the basis of the joint-lime distance scale of rates prescribed in Falling Spring Lime Co. *v.* C. & O., 172 I. C. C. 783. The car-load minimum weight is 60,000 lb.—F. S. O No 12,034.

Sand.—The Commission has awarded reparation on finding that the car-load rate on core and molding sand from Millville and Manumuskin, N. J., to Hartford, Conn., was unreasonable to the extent that it exceeded $3.50 a net ton. A rate of $4.10 was charged on shipments moving between April 21, 1931, and July 1, 1935. The $3.50 rate was on the basis prescribed in Industrial Sand Cases, 1930.—I. C. C. Docket No. 26,758, Hartford Electric Steel Corp. *v.* Pennsylvania *et al.*

Reparation has been awarded on finding that the rates on sand (other than silica and naturally-bonded molding sand) from Birmingham and S. Pemberton, N. J., to Philadelphia, Pa., and near points were and are unreasonable to the extent that they exceeded or exceed rates based on the scale prescribed in Buckland *v.* B. & A., 139 I. C. C. 88. The Commission also found that Sec. 13 had been violated by allowing competitors in Pennsylvania preferential rates. This undue preference may be removed by establishing intrastate rates not exceeding rates made under the Buckland scale which the Commission finds to be reasonable maxima, and not less than a rate of 55 c. which the Commission finds to be a reasonable minimum and by maintenance on like traffic from the plants of the competitors of intrastate rates which shall not be less than the reasonable interstate rates concurrently maintained from complainants' plants. The rates on gravel from and to the same points and on sand and gravel from the same origins to destinations on the Trenton Cut-off were not found to be unreasonable or otherwise unlawful.—I. C. C. Docket No. 26,596, Noreross Bros. v. Pennsylvania.

The Commission has awarded reparation on finding that the rate on silica sand from Ottawa, Ill., to Louisville, Ky., was unreasonable to the extent that it exceeded $2.64 over routes less than 15 per cent. circuitous and to the extent it exceeded $2.80 over other routes over which the destinations did not exceed 400 mi. The rates charged over routes in excess of 400 mi. in length were not found to be unreasonable.—I. C. C. Docket No. 26,534, Standard Sanitary Mfg. Co. *v.* C. & E. I. *et al.*

Examiners' Reports

Lime.—Examiner C. W. Griffin proposes that the Commission find the rates on lime from Sherwood and Knoxville, Tenn., to destinations in Ohio, Indiana, Illinois and West Virginia unreasonable and unduly prejudicial to the extent that they exceed rates made by the application of a distance scale shown in an appendix to his report. This scale provides for a rate of $1.90 for distances from 25 to 40 mi. and runs out with a rate of $4.60 per ton for distances from 670 to 700 mi., these rates applying on a car-load minimum weight of 30,000 lb. Another scale for a car-load minimum weight of 50,000 lb. provides rates 90 per cent. of the rates applying on the lower minimum. Shippers who have preferential rates to the territory involved are located at Durbin, Cold Springs and Marble Cliff, O., Mitchell and Milltown, Ind., St. Genevieve and other Missouri points, Bellfonte, Pa., and producing points in Virginia and West Virginia. —I. C. C. Docket No. 26,829, Gager Lime Mfg. Co. *v.* Alton *et al.*, and No. 26,845, Williams Lime Mfg. Co. *v.* Southern *et al.*

Examiner John Davey recommends that the Commission award reparation on finding that the rate on lime, car-load minimum weight 50,000 lb., from Springfield, Mo., to Caw, Okla., is unreasonable to the extent that it exceeds 16 c. He proposes that the rates from Springfield to Seminole and Okemah, Okla., be found not unreasonable.—I. C. C. Docket No. 26,889, Carter Oil Co. *v.* St. L.-S. F. *et al.*

Sand.—Examiner John Davey recommends that reparation be awarded on finding the rates on sand from Newport, Menantico and Manumuskin, N. J., to Jeddo, Pa., unreasonable to the extent that they exceeded $1.80 per net ton.—I. C. C. Docket No. 26,794, Jeddo-Highland Coal Co. *v.* C. of M. J. *et al.*

Stone.—Examiner Arthur Kettler proposes that relief from the long- and short-haul provisions of Sec. 4 to destinations in trunk line territory and points in the eastern part of central territory be granted on (a) ground or pulverized limestone and stone dust, from producing points in New Jersey, Pennsylvania, Maryland, New York, Vermont, Virginia, West Virginia, Massachusetts, Connecticut and Maine, (b) crushed stone from Lime Crest, N. J., and (c) ground marl from Alba Marl Lime Co., Natural Lime Marl Co. Siding, W. Va., and Marl, Md., and to destinations in New England territory on (a) ground or pulverized limestone, from producing points in New Jersey, New York, Pennsylvania, Vermont, Massachusetts, Connecticut and Maine, and (b) broken or crushed limestone from producing points in Vermont, Massachusetts, Connecticut and Maine, subject to the following conditions:

(a) Rates from and to groups shall be substantially a fair average of the point-to-point rates which would otherwise apply.

(b) Rates from points in trunk-line territory to destinations in central territory intermediate to destinations in trunk-line territory shall not exceed rates upon the basis prescribed for application from the Martinsburg district to destinations in trunk-line territory.

(c) Rates from points in trunk-line territory to destinations in New England territory intermediate to destinations in trunk-line territory shall not exceed rates upon the basis prescribed for application from Lime Crest to destinations in New England.

(d) The rates shall in no case exceed the lowest combination of rates subject to the act.

(e) The authority granted shall not apply to lines or routes that are longer than the shortest established routes of the lengths shown in column A below by more than the amounts shown opposite in column B:

A	B
Miles	70 per cent.
120 and under	85 miles
170 and over 120	50 per cent.
Over 170	

(f) The authority granted shall not apply to rates that do not yield more than 4 mills per ton-mile under the basic scales applied within New England and more than 3 mills per ton-mile under the basic scales applied within trunk-line territory and between New England and trunk-line territories.—F. S. A. No. 15,747, 15,780, 15,895 and 15,917.

New Complaints Filed

Sand.—Five complaints on sand rates have recently been filed all alleging violation of Sec. 1 and all asking for reparation.

V. W. Jones, Comptroller, 2323 E. 67th Street, Cleveland, Ohio, has filed three complaints covering the rates on silica sand from Ottawa, Ill., to Cleveland, O., in I. C. C. Docket No. 27,117 Sub. No. 1, 2 & 3, The Cleveland Coöperative Stove Co., Cleveland *v.* C. R. I. & P. *et al.*

R. W. Schapanski, Fruit Distributors' Building, Chicago, Ill., attacks the rates on sand from Ottawa, Ill., Ironton and Mayville, Mich., to Dayton, O., in I. C. C. Docket No. 27,173, Dayton Malleable Iron Co., Dayton, O., *v.* B. & O. *et al.*

J. H. Sturtevant, 101 Milk St., Boston, Mass., attacks the rates on molding sand from points in New York and New Jersey to Hills Grove, R. I. in I. C. C. Docket No. 27,177, Rhode Island Malleable Iron Works, Hills Grove, R. I. *v.* New Haven *et al.*

Motor Carrier Regulation

That part of the Motor Carrier Act relative to the issuance of certificates, permits and licenses became effective on Oct. 15 instead of Oct. 1. The extension of time was necessary to allow the Commission to provide the necessary forms for application.

Any person or firm engaged in interstate commerce by motor vehicle and subject to the provisions of the act, or if in doubt as to whether it is or is not subject to such provision, should immediately write the Commission asking for blanks for filing applications. In case the operator is not subject to the act he will be so notified by the Commission.

Under the terms of the act anyone engaged in the common-carrier business on June 1 and contract-carrier business on July 1, 1935, will obtain certificates and permits if applications are filed within 120 days after Oct. 15 without the necessity of providing proof of public convenience and necessity.

The Commission has selected John L. Rogers of Tennessee as Director of the Bureau of Motor Vehicles and the following men to head various divisions; Park M. Smith, assistant director; W. Y. Blanning, assistant director; H. M. Roberts, chief, Section of Certificates and Insurance; Henry L. Clallanan, assistant chief,

(*Continued on page 45*)

New Machinery and Supplies

New Protective Goggle Provides Full-View Vision

A new goggle, exactly like the Ful-Vue spectacles in its appearance and in many of its design features, has just been announced by American Optical Co., Southbridge, Mass. The chief advantages of the new F3100, Ful-Vue goggle, as stated by the manufacturer, are its appearance and its comfort, features which are expected to make it easier to enforce goggle programs. For the customary nose-piece the new goggle substitutes pearl full-rocking nose-pads which distribute the slight weight of the goggle on the sides rather

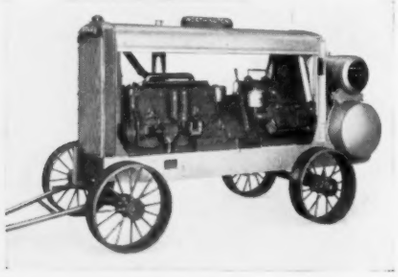
New type safety goggle which provides full-view vision.

than on the top of the nose. Ear-pieces are of flexible cable, completely insulated, so that no metal touches the skin at any point. As on the popular Ful-Vue spectacle frames, the ear-pieces are set high on the rims, removing every obstruction to full side vision and adding to the goggle's good looks. Comfortable fitting is made easy by the adjustable nose-pad supports and by the universal swivels that allow the nose-pads to conform automatically to the contour of the nose.

The F3100 Ful-Vue goggle is fitted with the new 6-curve super armorplate lenses, capable of withstanding blows approximately twice as heavy as those which fracture standard lenses. The domed surface of the lens is declared to be exceptionally effective in deflecting glancing blows. The lenses are shaped to fit closely to the eye without interfering with eyebrows or lashes.

Two-Stage Air Compressors Available in Portable Form

Four models of Aero-2-Stage portable compressors for delivering 105, 160, 210, and 315 cu.ft. of actual air per min. (A.S.M.E. standard test), for use wherever a mobile compressed-air plant is needed by quarry operators and others, are now offered by the Worthington Pump & Machinery Corp., Harrison, N. J.

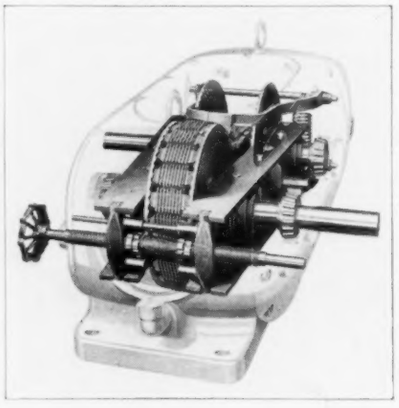


Two-stage portable air compressor which is available in four models.

Advanced design features throughout insure highest efficiency and endurance with delivery of the greatest volume of air at lowest fuel and maintenance cost. For example the 105, 160, and 210 models are compact, convenient and complete compressed-air plant units. They are balanced-angle, two-stage, air-cooled, unit-assembly, with clutch connection to heavy-duty 6-cyl. gasoline engines. The speed is 830 r.p.m., the air pressure, 100 lb. gage. Bores, strokes, and number of cylinders differ in the various models. The compressors are equipped with improved feather valves, ring-type cooling fins, articulated connecting rods, drop-forged crankshaft, Timken roller-bearings, spray and force-feed lubrication, oil filter, and V-belt-driven cooling fan. The engines are Hercules, heavy-duty, with 7-bearing crankshaft, removable cylinder sleeves, exhaust-valve inserts, permanent oil filters, fuel strainers, roller-bearing V-belt-driven fans, and other modern features. Mounting of the unit depends upon the requirements and size. Thus the 105 model may be had as follows: skid-mounted; steel wheel; solid rubber or pneumatic tired towabout; four-wheel solid rubber or pneumatic tired spring trailer; two-wheel single-axle spring trailer with solid rubber or pneumatic tires; truck-mounted; power take-off drive; rail car; mine car.

Variable-Speed Transmission Designed with New Features

Announcement is made by the Link-Belt Co., Chicago, that in order to meet the growing demand for still greater range and flexibility of application, certain features of design have recently been incorporated in its P. I. V. gear variable-speed transmission, which will allow the entire line to be furnished in the following combinations and sizes: (1) Motorized (when desired), with motor forming an integral



Phantom view of gear-type variable-speed transmission.

part of the unit; (2) with or without speed-reduction gearing; (3) with horizontal or vertical box; and (4) in 5 sizes up to 15-hp. capacity.

Previous P. I. V.'s were available in sizes up to but 10 hp., with horizontal box only, and without reduction-gear sets or the integral-motor feature. The motorized construction is said to make a very compact drive, eliminating the need of a separate motor base plate.

The operating principle of the basic unit remains the same as when introduced to American industry six years ago, at which time the unit was described as an innovation in variable-speed transmission, since it was the first all-metal, automatically-lubricated device which employed a specially-designed side-contact chain operating between adjustable-diameter wheels with radially-cut teeth, for transmitting the power positively from input to output shaft.

Bars of Cantilever Grizzly Unattached at Lower End

The Allis-Chalmers cantilever grizzlies, or cantilever bar screens, have many advantages over the ordinary bar screens heretofore in common use. As the word cantilever implies, the bars are fixed only at the head end. The absence of bar tie rods at the lower end eliminates the clog-

Cantilever bar grizzly utilizing new principle of design.

ging often experienced there with ordinary types of bar screens. The impact of the material on the grizzly causes the overhung free ends of the bars to vibrate horizontally, keeping the material from wedging. Thus, with higher efficiency it can handle large tonnage more effectively. The cantilever grizzly has the advantages of simplicity, low first cost, low maintenance cost, ease of operation, ease of repairs and the fact that there are no moving parts that require power. The most common use for cantilever grizzlies is for separating fines from crusher feeds of various kinds. They are available with openings from 1 in. to 3 in. between bars, according to individual requirements. The bars are tapered in section and made of high-quality manganese steel to resist wear.

Complete Line of New Instruments Announced

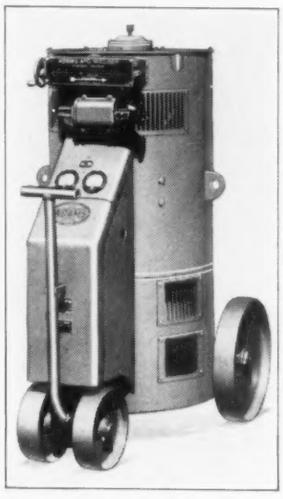
On its 75th anniversary, the Brown Instrument Co., Philadelphia, Pa., announces a new and complete line of recording and indicating air-operated controllers for temperature flow, pressure and liquid level. The most outstanding of these is the Brown Air-o-Line, a controller with 1 to 150 per cent. throttling range and automatic reset. This control system recognizes and corrects for the magnitude, rate and direction of departure from the control point. These instruments are capable of full automatic control and will maintain a process at the control point within extremely close limits. Radically new is the simplicity of the means provided for "tuning in" the controller to the specific process characteristics without interruption to automatic control. Throttling range and automatic reset dials are instantly adjustable with a screwdriver, without removing the chart plate. Indicating and

recording thermometer-type temperature controllers are available for temperatures within limits of —40 deg. F. and +1200 deg. F. Potentiometer-type controllers are available for temperatures within limits of —300 deg. F. and +3400 deg. F. Two types of flow controllers and liquid level controllers are also offered; the inductance bridge type and the mechanical type. Thus, for the first time, the remote operating characteristics of the electric flow meter and the flexibility of air-operated control are combined in one controller. Indicating and recording pressure controllers are available in ranges from 30 in. vacuum to 3,000 lb. per sq.in. pressure.

In addition to the "Air-o-Line," three other types of Brown air-operated controllers are included in the new line. These are the "Full Throttler," a controller with 1 to 150 per cent. throttling range and manual reset; the "Throttler," a controller with 1 to 10 per cent. throttling range and manual reset; and the "On-Off Controller," a controller for two-position service.

Arc Welders Are Portable And of Vertical Design

The J. D. Adams Co., Indianapolis, Ind., announces a new line of portable electric arcwelding machines of vertical design. Advantages claimed for the vertical type of welder are: Gyroscopic stabilization of dynamically-balanced rotating parts reduces vibration to a minimum and there is

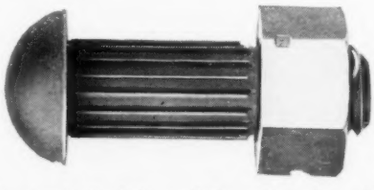


New portable arc welder of vertical design.

no end float in the armature shaft, minimizing brush and commutator wear; Clean air is taken in at the top of the machine and exhausted through bottom louvres; Lower center of gravity and lower tipping angle. These arcwelders are available in 200, 300, and 400 ampere sizes for direct current.

Ribs on Shank of Bolt Facilitate Hand Driving

The structural rib bolt is used in the erection of tanks, towers, cars, etc., in conjunction with the automatic nut made by the Automatic Nut Co., New York. It has the standard American Boiler Makers' Assn. button head, and the ribs embed themselves in the wall of the work making



Structural rib bolt used in conjunction with automatic lock nut.

a tight fit. Made from carbon-manganese steel it has a minimum tensile strength of 70,000 lb. per sq. in.

It has a standard U. S. S. thread, and the bolts are made in either black or galvanized finish. The only equipment necessary for its use is a hand hammer and wrench, effecting a saving, especially when used in the field.

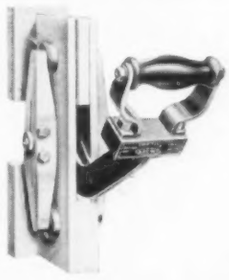
One of the most important features of the structural rib bolt is the fact that it eliminates the objectionable noise that always occurs when riveting. It is made in all sizes and lengths.

Special Type of Knife Switch for Dusty Places

A knife switch known as the Klamp-Tite, manufactured by the Automatic Reclosing Circuit Breaker Co., of Columbus, O., is now available in single- and multiple-pole styles in high- and low-voltage types from 600-amp. capacity upward. The new switch is particularly well suited for dusty or gaseous atmosphere applications.

In the Klamp-Tite all contact pressure producing springs have been kept outside the current-carrying circuits, and dust and oxidation can not result in overheating the switch blades to result in further loss of contact pressure. The switch is first closed and then automatically clamped with thousands of pounds pressure on the contacts. When in the closed position, the contact joints have, it is claimed, a full-load drop equal to only one-third that of old-style switches and the switch thus meets most engineering specifications for voltage drop on bolted bus-bar joints. There are no spring jaws to anneal on overloading and the operator's hand is beyond the danger-zone in opening and closing.

During the opening and closing cycles two distinct effects are produced. In moving from the open position to the closed position the blades slide over the contact studs with a complete wipe and under the customary knife-switch pressure. In moving from the closed position to the clamped-shut position, the blades remain stationary, while the handle becomes a wrench handle and rotates a clamping bolt, thereby tightening the clamping bars. Enormous pressure is transmitted equally to both top and bottom contacts. This pressure is many times greater than that under which a switch could ordinarily be manipulated. So great is the pressure developed that it is impossible to pry the switch open.



Views showing switch open above; closed at right and clamped at left below.

As the handle moves through the first part of its stroke in opening, the clamping bolt is rotated so as to reduce the high pressure to normal knife-switch pressure before the blades begin to move. Quick action in both opening and closing can be had with little effort. In closing, the hand of the operator follows the blades, whereas in opening, the handle swings away from above the blades before the blades begin to move.

Centralized Lubricating Station Is Developed

The Farval Corp., Cleveland, O., makers of centralized systems of lubrication has developed a highly efficient, small automatic central station for machine lubrication. The lubricant pumping station is complete with reservoir, pumping unit, reversing valve and hydraulic adjustable timer. Two main supply lines leading from the central unit are connected to all of the Farval Dualine valves in the complete centralized lubricating system, these valves being located at or near the bearings they serve, the two lines from the central station serving to provide a complete and fully automatic operation of all measuring valves.

Lubricant is delivered to all bearings at high pressure, in exact, measured quantities, and at regular time intervals. Each dualine valve is fully adjustable as to the quantity it delivers to the bearing and all valves are self-indicating to show their positive and successful operation. The system is designed to serve bearings that require the delivery of a small quantity of lubricant at frequent intervals and is ideal for practically all types of plant equipment, including crushers.

The unit shown provides the complete automatic central pumping station and can be located at any convenient point on the machine. It can be furnished for a rotary or a reciprocating drive or with motor and worm gear drive as shown. With this type of unit the delivery of lubricant to all bearings included in the system under high pressure is insured, it forming the means for alternating the pressure from one supply line to the other at regular time intervals. The unit employs an hydraulic adjustable type timer while the reversing valve automatically alternates the pressure from one line to the other at the end of the predetermined time and upon the attainment of a predetermined pressure in the supply line. The pressure at which the reversing valve will operate is adjustable so that it is possible to set the system for practically any desired pressure required.

Single-Stage Compressor For Starting Gas Engines

A new fast-working single-stage air-compressor for starting gas and Diesel engines, capable of filling a tank 6 cu.ft. capacity up to 200 lb. pressure in 5 min. or up to 250 lb. in 9½ min., is now offered by the Cooper-Bessemer Corp., Mt. Vernon, O. The new unit, to be known as the GX3A, runs equally well on either gas or gasoline. It is a simple, self-contained combination engine and compressor and is of very moderate cost. Ford parts are largely used, pistons, piston-rings, connecting rods, connecting-rod bearings, engine valves, and many smaller parts being thus obtained.

Both power and compressor cylinders, cast in one piece, are water-jacketed. The power-cylinder head, which is a separate casting, is of the automotive type, water-cooled, and carries a spark plug only. A Ford Model B gasoline carburetor and an adjustable gas-mixing valve are furnished as standard equipment, also a rotary-type magneto with impulse coupling for hand starting.

Where gas is the fuel, it is possible to start the engine on gas, but the recom-

mended procedure is to start on gasoline, then switch to gas. A 1-gal. gasoline tank is mounted over the compressor and connected to the carburetor.

Splash lubrication is automatically provided for all parts. Oil reservoirs feed lubricants to the main bearings, valve tappets, camshaft bearings, governors, and magnetic drive.

Burner Designed to Thaw Frozen Chutes and Materials

The Aeroil Burner Co., West New York, N. J., is making a portable torch which is useful in thawing frozen machine parts, bin chutes, sand, gravel, stone and slag, and in breaking bowlders. It burns kerosene, gasoline, range oil, stove oil or light furnace oil at an average rate of 1½ gal. per hr. It produces a flame 3 in. in diameter and 30 in. long, having a temperature of 2,000 deg. F. The equipment includes a 4-gal. fuel and air tank made of copper-bearing, corrugated, galvanized steel; a 2-in. brass air pump with a pressure gage; 7 ft. of oil-resisting rubber hose with brass nipples; a seamless steel coil burner and windshield with a bronze regulating valve; and a snap-on web shoulder strap.

Burner for thawing frozen bin chutes, gravel and stone and for breaking bowlders.

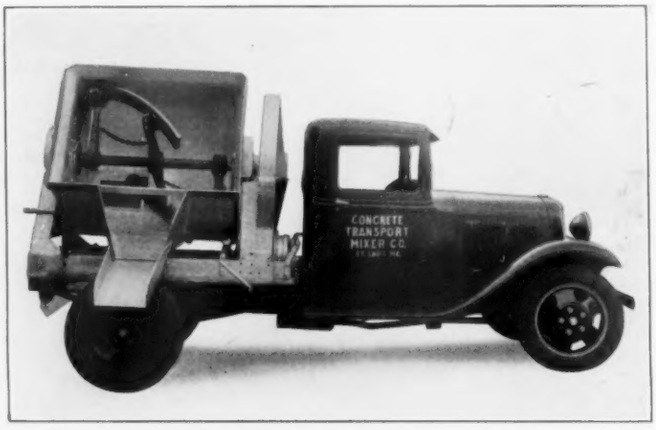
New Model of Quarry Locomotive Uses V-8 Engine

The Brookville Locomotive Co., Brookville, Pa., builder of Ford-powered locomotives since the early days of the old Model T, is now using the Ford V-8 engine in a new series of locomotives ranging from 2½ to 6 tons in weight. These locomotives also employ the Ford four-speed truck transmission and the new Ford truck clutch, all the Ford assembly being installed without alteration to allow servicing with standard Ford replacement parts by any authorized Ford dealer. The power is transmitted through the Brookville reverse, which makes all four forward speeds also available in reverse. Other features of the locomotive include: steel-tired drive wheels; dual-spring journal suspension; Timken bearings; rounded cast steel endsills; structural-steel frame; five pocket link-and-pin couplers; and all-steel cab. The models are made for any track gage.

Locomotive powered by a Ford V-8 engine.

Truck Mixer Discharges To Either Side or Rear

The Concrete Transport Mixer Co., 650 Rosedale Av., St. Louis, Mo., is manufacturing the Master Mixer, a mixing-in-transit machine. The device comprises an open-top metal hopper within which is rotated, by the power of the truck's engine, a horizontal shaft carrying helical blades that mix the contents. The blades can be rotated at different speeds, ranging from 1 to 20 r.p.m. Discharge can be made either to the side or to the rear, and asphalt and road oils can be handled, as well as concrete mixes. The power take-off is made by the company and makes the mixing unit applicable to any type of truck. Truck mixers are available in capacities of 1 and 1½ cu. yd., truck agitators in capacities of from 1 to 3½ cu. yd., and plant mixers (stationary) in capacities of from 1 to 3 cu. yd.

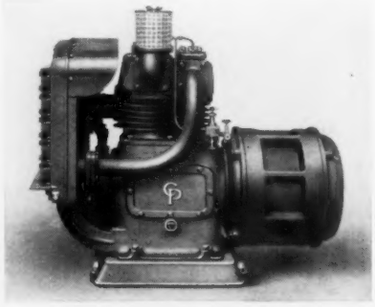


Truck-mounted concrete mixer designed to discharge to either side or to rear.

Two-Stage Air Compressors Use Intercooling Device

The Chicago Pneumatic Tool Co., 6 E. 44th St., New York, N. Y., is manufacturing two-stage, air-cooled motor-driven compressors in several types. These machines, at 100 lb. pressure, require approximately 15 per cent. less power per cu. ft. of air delivered than single-stage units, it is claimed. They use air-cooled intercoolers, Simplate valves with a large flow area, and smooth unrestricted air passages. The smaller sizes use 2 cylinders, the larger 4, cast in pairs. They are set vertically in line, each connecting rod having its own individual crank pin. The low-pressure and high-pressure assemblies are balanced and the crankshaft is counterbalanced. Force-feed lubrication is used throughout. The piston pins are of the full-floating type. An air-cooled, finned intercooler, having a sectionalized core and served by a V-belt fan driven from the compressor crankshaft, cools the air between the first and second stages to a temperature within a few degrees of the low-pressure intake temperature. The intercooler also removes moisture, so that the delivered air is dry as well as cool. The driving motors are either built in, or connected by flexible couplings or V-belts. Some models are obtainable with pulleys for flat-belt driving.

Regulation is accomplished by holding open the inlet valves. When the air supply exceeds the demand and the discharge pressure rises above the maximum required, the unloader admits air at discharge pressure to a diaphragm in the inlet-valve assembly, holding the inlet-valve disks off their seats. When the pressure has dropped to the desired minimum, the unloader closes, allowing the inlet valves to seat and compression to be resumed. The pressure settings are adjustable. Provision is made for unloading by hand when starting. When the demand for air is intermittent, electric motor-driven compressors can be equipped with dual control—a combination of the constant-speed control just described and automatic start-and-stop control, which allows the motor to start and stop automatically in accordance with the demand for air.



Two-stage air compressor with intercooling device.

Time-Purchase Plan Helps Buyers Utilize FHA Aid

The Worthington Pump & Machinery Corp., Harrison, N. J., announces the development of a term-payment purchase plan to enable buyers of its products to take advantage of the provisions of the National Housing Act, as amended for industry. Because of the emphasis on the word "housing" it is not generally understood by users of industrial equipment that the National Housing Act has been amended to enable them to purchase needed equipment. The Worthington Corp. believes that the resumption of the purchase of industrial equipment, or "durable goods," is an essential part of the business cycle, and is one which must not be allowed to lag if a return to normal business activity is to be achieved. It has prepared a 4-page folder, explaining the plan in detail.

Canadian Branch Formed by Western Precipitation

The Precipitation Co. of Canada, Ltd., has been formed by the Western Precipitation Co., of Los Angeles, Cal., and New York, N. Y., to handle its dust-collector business in Canada. Its office is in the Dominion Square Bldg., Montreal. The new company was organized through the firm's New York office, of which C. H. Brandes is in charge. The dust-collecting equipment made by the company includes the Cottrell process of electrical precipitation and the Multiclone mechanical collector.

MANUFACTURERS' PUBLICATIONS

Amsco Nickel Manganese Steel Welding Rod. 6 p. (Bulletin No. 10, American Manganese Steel Co., Division of American Brake Shoe & Foundry Co., Chicago Heights, Ill.) Describes and illustrates steel welding rod manufactured by this company.

The Michigan Truck Shovel. 8 p. (Michigan Power Shovel Co., Benton Harbor, Mich.) Describes and illustrates the truck shovel and truck crane manufactured by this company.

Worthington Double Helical Pumps. 12 p. (Bulletin W-475-B8, Worthington Pump & Machinery Corp., Harrison, N. J.) Describes and illustrates internal roller-bearing (Type GR), internal sleeve-bearing (Type GS) and external ball-bearing (Type GE) pumps manufactured by this company.

Weld It Well. 25 p. (Bulletin HW-4, Harnischfeger Corp., Milwaukee, Wis.) Describes a complete line of P&H-Hansen arc welders, as well as welding fixtures and accessories, produced by this company.

Worthington De-aërating Feedwater Heaters. 4 p. (Bulletin W-210-B17, Worthington Pump & Machinery Corp., Harrison, N. J.) Describes and illustrates de-aërating feedwater heaters for saving fuel.

Deep-Well Pumps. 4 p. (Bulletin W-450-B24, Worthington Pump & Machinery Corp., Harrison, N. J.) Describes and illustrates deep-well turbine pumps manufactured by this company.

On the Aqueducts of the Pacific with Atlas Giant Powder. 64 p. (Atlas Powder Co., Wilmington, Del.) A complete description, with illustrations, of the Colorado River Aqueduct of Southern California.

HydroSeal Sand Pump. 24 p. (Catalog No. 735, The Allen-Sherman-Hoff Co., Philadelphia, Pa.) Describes and illustrates a line of rubber-lined sand pumps manufactured by this company.

Bulldoze Your Way to Greater Profits. 6 p. (Form No. 647, Cleveland Tractor Co., Cleveland, O.) Describes and illustrates the Cletrac and Bulldozer.

Wheel Scoop or Fresno. 6 p. (Form No. 650, Cleveland Tractor Co., Cleveland, O.) Describes and illustrates the scoop tractor attachment manufactured by this company.

Amsco Hard-Facing Welding Rods. 6 p. (Bulletin No. 20, American Manganese Steel Co., Division of American Brake Shoe & Foundry Co., Chicago Heights, Ill.) Describes and illustrates welding rods.

Rivers of Dirt. 16 p. (Jeffrey Mfg. Co., Columbus, O.) Describes and illustrates the conveying methods in use at Grand Coulee Dam on the Columbia River in Washington.

Condor Compensated Belt. 4 p. (Bulletin No. 6808-B, Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., Passaic, N. J.) Describes and explains the details of construction of Condor Compensated belt manufactured by this company.

Pioneer Conveyors. 16 p. (Form No. 504, Pioneer Gravel Equipment Mfg. Co., Minneapolis, Minn.) Describes and illustrates the line of conveying equipment manufactured by this company.

Johns-Manville Industrial Products. 48 p. (Form GI-4A-9-35, Johns-Manville, 22 E. 40th St., New York, N. Y.) Describes and illustrates a line of insulating materials, refractory cements, waterproofing and damp-proofing materials, etc., manufactured by this company.

Combined Engine and Compressor. 4 p. (Form 110—5M, Cooper-Bessemer Corp., Mount Vernon, O., and Grove City, Pa.) Describes and illustrates combined engine and compressor, made by this company.

Ruth Accumulators. 8 p. (Bulletin R.A.-35-5, Foster Wheeler Corp., 165 Broadway, New York, N. Y.) Describes and illustrates Ruths steam storage systems manufactured by this company.

Lincoln "Shield Arc" Welder. 4 p. (Bulletin No. 310, Lincoln Electric Co., Cleveland, O.) Describes and illustrates a new engine-driven welder.

Style "B" Newhouse Crusher. 16 p. (Bulletin 1469-D, Allis-Chalmers Mfg. Co., Milwaukee, Wis.) Describes and illustrates the company's gyratory crusher, which is driven directly by an electric motor mounted above the crusher spider. The Bulletin gives operating data and dimensions and shows numerous installation pictures.

Mirror Finish. 8 p. (The Timken Roller Bearing Co., Canton, O.) Describes and illustrates the new Profilgraph surface-measuring device.

Electric Heating Data Book. 24 p. (No. 236, Electric Air Heater Co., Div. of American Foundry Co., Mishawaka, Ind.) Illustrates and describes space heating by Electromode forced heat, gives cost comparisons with other methods of heating, illustrates applications of Electromode industrial, portable and "Bilt-in-Wall" all-electric fan type unit heaters.

Brown Air Operated Controllers. 24 p. (Catalog No. 8903, The Brown Instrument Co., Wayne & Roberts Aves., Philadelphia, Pa.) Illustrates and describes the Air-o-Line system of control, produced by this company.

Traffic (from page 41)

Section of Certificates and Insurance; Walter Hayes, chief, Section of Traffic; W. A. Hill, chief, Section of Complaints; Maurice E. Sheahan, chief, Section of Accounts; J. Edward Davey, chief, Section of Finance; Grover L. Swink, assistant chief, Section of Finance; H. H. Kelly, chief, Section of Safety; George R. Wellington, assistant chief, Section of Safety; Jack G. Scott, chief, Legal and Enforcement Section; George A. Casey, assistant to the director.

Tariffs showing the rates to be charged by common and contract carriers must be filed with the Commission not later than Dec. 1 unless the Commission extends the time for filing before that date. The National Highway Users' Conference has issued a bulletin warning motor carriers against using railroad tariffs and classifications as a basis for making motor rates. The bulletin states that the Act indicates a statutory admonition to establish the rate and charges on a basis of cost to the carrier plus a reasonable rate and that quite apparently it is not the statutory intent to utilize the railroad yardstick to establish motor rates and tariffs.

Commission Practitioners

The National Industrial Traffic League has gone on record as opposing Senate Bill 2,944, the object of which is to restrict practice before government bureaus and commissions to licensed attorneys.

Transportation Association

The Transportation Association of America organized for the purpose of combating any legislation tending toward government ownership of the railroads has on its board of directors representatives of the principal industries that use the railroads. L. C. Newlands, vice-president and general manager of the Oregon Portland Cement Co. of Portland, Ore., is one of the directors. Donald D. Conn, executive vice-president of the association, speaking at the meeting of the Atlantic states advisory board at Rochester, New York on Oct. 3, stated that the association will attempt to determine a sound national transportation policy for the future to the end that the public shall always receive the best, most convenient and most economical service and that the fundamental principle of Americanism, private investment and private enterprise shall be perpetuated in transportation, the nation's largest commercial industry.

Statement of Ownership

PIT AND QUARRY

Statement of the ownership, management, circulation, etc., required by the Act of Congress of March 3, 1933, of PIT AND QUARRY, published monthly at 538 S. Clark Street, Chicago, Ill., for October 1, 1935.

State of Illinois, County of Cook, ss.

Before me, a notary public in and for the state and county aforesaid, personally appeared H. W. Baumgartner, who, having been duly sworn according to law, deposes and says that he is the business manager of PIT AND QUARRY, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse side of this form, to-wit:

1. That the names and addresses of the publisher, editor, managing editor, and business manager are:

Publisher, Complete Service Publishing Co.; Editor, S. A. Phillips; Business Manager, H. W. Baumgartner, all of Chicago, Ill.

2. That the owner is Complete Service Publishing Co., Chicago, Ill. That the stockholders owning 1% or more of the total amount of stock are: H. W. Baumgartner and I. A. Baumgartner, both of Chicago, Ill.

3. That there are no bondholders, mortgagees, or other security holders owning or holding 1% or more of total amount of bonds, mortgages or other securities.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest, direct or indirect, in the said stock, bonds, or other securities than as so stated by him.

H. W. BAUMGARTNER,
Business Manager.

Sworn to and subscribed before me this 27th day of September, 1935.
(Seal)

MICHAEL MOTTO,
Notary Public.

My commission expires Aug. 2, 1937.

Classified Buyers' Guide

A Directory of PIT AND QUARRY Advertisers Arranged According to Product

Although every effort is made to insure accuracy and completeness in these listings, the publisher cannot accept responsibility for errors or omissions. Any mistakes discovered will gladly be rectified, if brought to the attention of the Advertisers' Service Department.

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Aggregate-Bituminizing Plants
Hetherington & Berner, Inc.

Agitating Ladders (Dredge)
*Eagle Iron Works

Agitators, Thickeners and Slurry Mixers
*Hardinge Co.

Air Compressors (Portable)
Chicago Pneumatic Tool Co.
Gardner-Denver Co.

Air Compressors (Stationary)
Chicago Pneumatic Tool Co.
Gardner-Denver Co.

Air Filters
Dracco Corp.

Air Pumps
Gardner-Denver Co.

Air Separators
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*Gruendler Crusher & Pulverizer Co.
*Hardinge Co.
Raymond Bros. Impact Pulv. Co.
Universal Road Machy. Co.

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Ryerson & Son, Joseph T.

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Hetherington & Berner, Inc.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.

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*Jeffrey Mfg. Co.
*Link-Belt Co.

Babbitt Metal
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*Austin-Western Road Machy. Co.
*Harnischfeger Corp.
*Lima Locomotive Works, Inc.

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*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
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*Hardinge Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Manganese Steel Forge Co.

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Hetherington & Berner, Inc.
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*Robins Conveying Belt Co.
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*Robins Conveying Belt Co.
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*Wickwire Spencer Steel Co.

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Flexible Steel Lacing Co.

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Republic Rubber Co.

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*Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
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*Ensign-Bickford Co.

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*Link-Belt Co.

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*Sauerman Bros., Inc.

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*Pioneer Gravel Equipment Mfg. Co.
*Robins Conveying Belt Co.
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Sprout, Waldron & Co.

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Bulk-Cement Storage Plants
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*American Steel & Wire Co.
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*Link-Belt Co.

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Carriers
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.
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Sprout, Waldron & Co.

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*Eagle Iron Works
*Hardinge Co.
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*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Link-Belt Co.
McLanahan and Stone Corp.
*Robins Conveying Belt Co.
Sprout, Waldron & Co.

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*Link-Belt Co.

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*Jeffrey Mfg. Co.
*Link-Belt Co.
Manganese Steel Forge Co.
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*Hendrick Mfg. Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
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*Robins Conveying Belt Co.
Sprout, Waldron & Co.

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*Deister Machine Co.
*Hardinge Co.
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*Jeffrey Mfg. Co.
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Knickerbocker Co.
Lewistown Foundry & Machine Co.
*Link-Belt Co.

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*Jeffrey Mfg. Co.
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*Robins Conveying Belt Co.
Sprout, Waldron & Co.

Conveyors and Elevators
*Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
Cross Engr. Co.
Dracco Corp.
*Gruendler Crusher & Pulverizer Co.
Haiss Mfg. Co., Geo.
*Hendrick Mfg. Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
*Link-Belt Co.
McLanahan and Stone Corp.
Morrow Mfg. Co.
New Holland Machine Co.
*Pioneer Gravel Equipment Mfg. Co.
*Robins Conveying Belt Co.
Smith Engr. Works
Sprout, Waldron & Co.
Universal Road Machy. Co.

Conveyors (Pneumatic)
Dracco Corp.

Conveyors (Ready-Mixed Concrete)
Haiss Mfg. Co., Geo.
Jaeger Machine Co.
*Link-Belt Co.
*Robins Conveying Belt Co.

Coolers (See Kilns and Coolers—Rotary)

Couplings (Flexible and Shaft)
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.
Sprout, Waldron & Co.

Couplings (Hose)
Chicago Pneumatic Tool Co.

Cranes (Crawler and Locomotive)
*Austin-Western Road Machy. Co.
*Harnischfeger Corp.
*Lima Locomotive Works, Inc.
*Link-Belt Co.

Cranes (Overhead)
*Harnischfeger Corp.

Crusher Parts
*American Pulverizer Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
McLanahan and Stone Corp.

Crushers (Cone)
Nordberg Mfg. Co.

Crushers (Hammer)
*Allis-Chalmers Mfg. Co.
*American Pulverizer Co.
*Austin-Western Road Machy. Co.
Bonnot Co.
*Dixie Machy. Mfg. Co.
*Gruendler Crusher & Pulverizer Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.

Crushers (Jaw and Gyratory)
*Allis-Chalmers Mfg. Co.
*Austin-Western Road Machy. Co.
*Gruendler Crusher & Pulverizer Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
New Holland Machine Co.
Nordberg Mfg. Co.
*Pioneer Gravel Equipment Mfg. Co.
Smith Engr. Works
Universal Road Machy. Co.

Crusher (Ring)
*American Pulverizer Co.

Crushers (Roll)
*Allis-Chalmers Mfg. Co.
*American Pulverizer Co.
*Austin-Western Road Machy. Co.
Bonnot Co.
*Gruendler Crusher & Pulverizer Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Link-Belt Co.
McLanahan and Stone Corp.
New Holland Machine Co.
*Pioneer Gravel Equipment Mfg. Co.
*Robins Conveying Belt Co.

*** See also information in the 1935 Pit and Quarry HANDBOOK.**

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It delivers an absolutely uniform product of any fineness desired from 60 to 400 mesh with greater capacity and lower power cost than is possible with any other type of air separator.

It is slow speed, requiring very little power. Repair costs are practically nothing—the only wearing parts are the steel cut gears and bearings enclosed in a dust proof casing.

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Kingston, N. Y.

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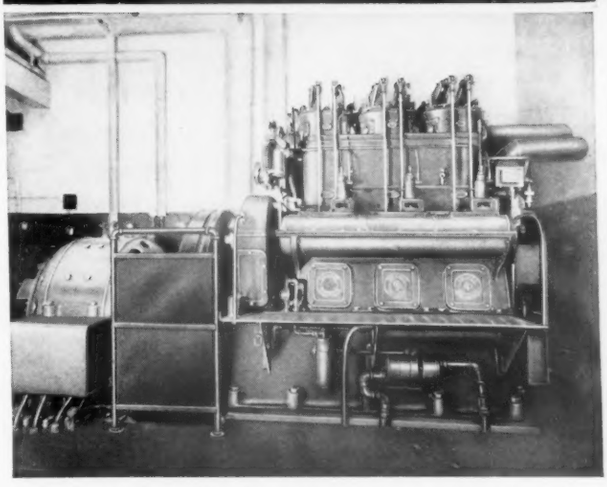
80 to 800 H. P.



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ELECTRIC TOOLS • PNEUMATIC TOOLS
VACUUM PUMPS & CONDENSERS
OIL WELL ROCK BITS, REAMERS & TOOL JOINTS

CHICAGO PNEUMATIC

Classified Buyers' Guide

A Directory of PIT AND QUARRY Advertisers Arranged According to Product

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Crushers (Rotary)
*Allis-Chalmers Mfg. Co.
*American Pulverizer Co.
*Austin-Western Road Machy. Co.
Bonnot Co.
New Holland Machine Co.

Crushing Rolls
*Allis-Chalmers Mfg. Co.
*Austin-Western Road Machy. Co.
Bonnot Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Link-Belt Co.
McLanahan and Stone Corp.
New Holland Machine Co.

Diesel Engines (See Engines—Diesel)

Doors (Iron)
Smith Wire & Iron Works, F. P.

Dragline Cableway Excavators
*Link-Belt Co.
*Sauerman Bros. Inc.

Dragline Excavators
*Austin-Western Road Machy. Co.
*Harnischfeger Corp.
*Lima Locomotive Works, Inc.
*Link-Belt Co.

Dredges
Hetherington & Berner, Inc.
*Morris Machine Works

Drilling Accessories
Chicago Pneumatic Tool Co.
Gardner-Denver Co.

Drilling Contractors
Hoffman Bros. Drilling Co.
Mott Core Drilling Co.
Pennsylvania Drilling Co.

Drills (Blast-Hole)
Chicago Pneumatic Tool Co.
Gardner-Denver Co.

Drills (Core)
Hoffman Bros. Drilling Co.
Mott Core Drilling Co.
Pennsylvania Drilling Co.

Drills (Diamond)
Chicago Pneumatic Tool Co.
Hoffman Bros. Drilling Co.
Mott Core Drilling Co.
Pennsylvania Drilling Co.

Drills (Rock)
Chicago Pneumatic Tool Co.
Gardner-Denver Co.
*Jeffrey Mfg. Co.

Drill Sharpening Machinery
Gardner-Denver Co.

Drill Steel
Chicago Pneumatic Tool Co.

Drills (Well) (See Drills—Blast-Hole)

Drives (Multiple, Belt, Chain, Rope)
*Allis-Chalmers Mfg. Co.

Dryers
*Allis-Chalmers Mfg. Co.
Bonnot Co.
*Hardinge Co.
Iowa Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Fdry. & Mch. Co.
McLanahan and Stone Corp.

Dust Arresters
Dracco Corp.

Dust-Collecting Systems
*Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
Dracco Corp.
Raymond Bros. Impact Pulv. Co.

Dust Conveying Systems
*Allen-Sherman-Hoff Co.
Dracco Corp.

Dust Handling Systems (Hydro Vacuum)
*Allen-Sherman-Hoff Co.

Dynamite (See Explosives)

Electrical Equipment
*Allis-Chalmers Mfg. Co.

Elevator Belting (See Belting)

Elevators (See Conveyors and Elevators)
chine Co.

Eliminators (Soft Stone) (See Soft Stone Eliminators)

Engineers
*Allis-Chalmers Mfg. Co.
Bonnot Co.
Cross Engr. Co.
Hetherington & Berner, Inc.
Iowa Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
McLanahan and Stone Corp.
*Robins Conveying Belt Co.
Sprout, Waldron & Co.
Sturtevant Mill Co.

Engine Generator Sets
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Engines (Diesel)
Buckeye Machine Co.
Chicago Pneumatic Tool Co.
Cummins Engine Co.
Nordberg Mfg. Co.

Engines (Internal-Combustion)
Buckeye Machine Co.
Cummins Engine Co.
Nordberg Mfg. Co.

Engines (Steam)
*Morris Machine Works
Nordberg Mfg. Co.

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Excavators—Shallow Grading (Bucket Elevator Type)
Haiss Mfg. Co., Geo.

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*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.

Feeders
*Allis-Chalmers Mfg. Co.
Bonnot Co.
*Hardinge Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Link-Belt Co.
Morrow Mfg. Co
*Pioneer Gravel Equipment Mfg. Co.
*Robins Conveying Belt Co.
Smith Engr. Works
Sprout, Waldron & Co.

Fencing (Woven Wire)
*American Steel & Wire Co.
Smith Wire & Iron Works, F. P.

Fire Escapes
Smith Wire & Iron Works, F. P.

Floor Sweeping Systems (Hydro Vacuum)
*Allen-Sherman-Hoff Co.

Forges (Oil)
Gardner-Denver Co.

Fuses (Detonating)
*Ensign-Bickford Co.

Gaskets
Republic Rubber Co.

Gasoline Engines (See Engines—Internal-Combustion)

Gates (Bin) (See Bin Gates)

Gates (Clamshell)
Haiss Mfg. Co., Geo.
*Link-Belt Co.

Gears (Herringbone)
*Jeffrey Mfg. Co.
*Link-Belt Co.
Sprout, Waldron & Co.

Gears and Pinions
Haiss Mfg. Co., Geo.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Sprout, Waldron & Co.

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Glass Sand Equipment
Lewistown Foundry & Ma-

Grab Buckets (See Buckets—Clamshell, Orange - Peel, etc.)

Grating (Steel)
*Hendrick Mfg. Co.
Ryerson & Son, Joseph T.

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Grizzlies
*Allis-Chalmers Mfg. Co.
*Eagle Iron Works
*Hendrick Mfg. Co.
Iowa Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Fdy. & Mach. Co.
Manganese Steel Forge Co.
*Robins Conveying Belt Co.
Smith Engr. Works
Universal Road Machy. Co.

Guards (Wire)
Manganese Steel Forge Co.
Smith Wire & Iron Works, F. P.

Guns (Hydraulic)
Hetherington & Berner, Inc.
Taylor Forge & Pipe Works

Hammer Mills (See Crushers—Hammer)

Hoists
Chicago Pneumatic Tool Co.
Gardner-Denver Co.
*Harnischfeger Corp.
Hetherington & Berner, Inc.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
McLanahan and Stone Corp.
*Pioneer Gravel Equipment Mfg. Co.
*Sauerman Bros., Inc.
Smith Engr. Works
Sprout, Waldron & Co.

Hoppers
*Hendrick Mfg. Co.
*Link-Belt Co.
Manganese Steel Forge Co.

Hose (Air, Steam and Water)
Chicago Pneumatic Tool Co.
Republic Rubber Co.

Hose (Radiator-Engine Cooling)
Republic Rubber Co.

Hose Couplings (See Couplings)

Hydraulic Guns (See Guns—Hydraulic)

Idlers
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.
Smith Engr. Works
Sprout, Waldron & Co.

Indicators (Bin)
Ripley Mfg. Co.

Kilns and Coolers (Rotary)
*Allis-Chalmers Mfg. Co.
Bonnot Co.
*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.

Kilns (Vertical)
*Hardinge Co.

Lime-Handling Equipment
*Hardinge Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Raymond Bros. Impact Pulv. Co.
*Robins Conveying Belt Co.

Lime and Hydrating Plants
*Hardinge Co.

Lime Kilns
*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.

Linings (Ball- and Tube-Mill) (See Mill Liners and Linings)

Loaders and Unloaders
Haiss Mfg. Co., Geo.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.
Sprout, Waldron & Co.

Locomotives (Electric, Gas and Steam)
*Lima Locomotive Works

Locomotives (Trolley-Battery)
*Jeffrey Mfg. Co.

Magnetic Pulleys (See Pulleys, Magnetic)

Manganese Steel
Manganese Steel Forge Co.
Ryerson & Son, Joseph T.

Manganese Steel (Plates and Sheets)
Manganese Steel Forge Co.
Ryerson & Son, Joseph T.

Mechanical Rubber Goods
Republic Rubber Co.

Mill Liners and Linings
*Hardinge Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.

Mills (Grinding) (See also Crushers—Hammer)
*Allis-Chalmers Mfg. Co.
*American Pulverizer Co.
Bonnot Co.
*Hardinge Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Knickerbocker Co.
Lewistown Fdy. & Mch. Co.
Raymond Bros. Impact Pulv. Co.
Sprout, Waldron & Co.

Motors and Generators
*Allis-Chalmers Mfg. Co.
*Harnischfeger Corp.

Motors (Internal-Combustion) (See Engines — Internal-Combustion)

Nails
*American Steel & Wire Co.
Ryerson & Son, Joseph T.

Netting (Locomotive Stack)
Smith Wire & Iron Works, F. P.

Nozzles (Gravel Washing)
*Deister Concentrator Co.

Nozzles (Hydraulic) (See Guns—Hydraulic)

Nozzles (Spray)
*Deister Concentrator Co.

Nuts
Automatic Nut Co.

Packings
Republic Rubber Co.

Partitions (Wire)
Smith Wire & Iron Works, F. P.

Paving Mixers
Jaeger Machine Co.

Perforated Metal Plates
*Allis-Chalmers Mfg. Co.
Chicago Perforating Co.
Cross Engr. Co.
*Hendrick Mfg. Co.
Morrow Mfg. Co.
Ryerson & Son, Joseph T.
Sprout, Waldron & Co.
*Wickwire Spencer Steel Co.

Pipe, Dredge (Floating and Shore)
Taylor Forge & Pipe Works

Pipe Flanges
Hetherington & Berner, Inc.
Ryerson & Son, Joseph T.
Taylor Forge & Pipe Works

Pipe Forms (Concrete)
Quinn Wire & Iron Works

Pipe Machines (Concrete)
Quinn Wire & Iron Works

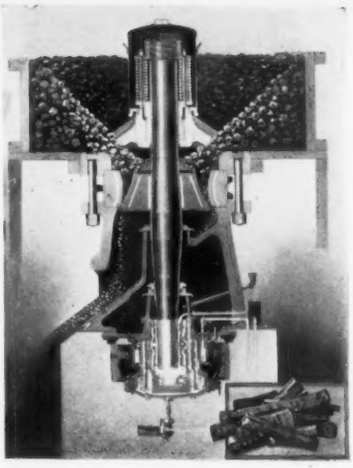
Plug Valves (See Valves)

Pneumatic Drills (See Drills, Rock)

Portable Conveyors
Haiss Mfg. Co., Geo.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.
Sprout, Waldron & Co.

Portable Crushing and Screening Plants
*Austin-Western Road Machy. Co.
*Gruendler Crusher & Pulverizer Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Pioneer Gravel Equipment Mfg. Co.

*** See also information in the 1935 Pit and Quarry HANDBOOK.**



IS YOUR PLANT EQUIPPED TO PRODUCE — ¼" and + ⅛" STONE FOR TOP DRESSING AS WELL AS ¾" ½" ⅜" SIZES?

There is a great demand for these sizes. The Kennedy Ball Bearing Gearless Gyratory Crusher for Fine Crushing will enable you to meet this demand.

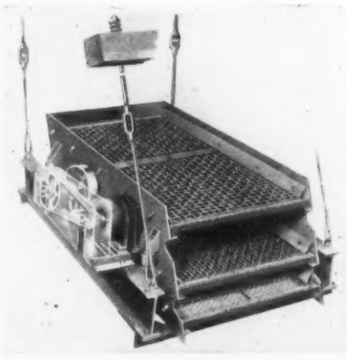
A carefully conducted test recently run on a No. 19 crusher operating on hard dolomite limestone 2½" oversize showed a production of more than 25 tons per hour of minus ¼" and plus ⅛" material. 20% was minus ⅛". It was operated with a 25 H.P. motor. The power consumed was 21 H.P. In the same plant one of our No. 25 crushers with a 25 H.P. synchronous motor built in its pulley produced 78 tons per hour when set to ⅞".

We have hundreds of customers who are getting equally as good results.

Getting double the capacity with half the power should be interesting to all people in the stone business.

If you are interested and would like to have one of our sales engineers call on you, please wire at our expense. You will be under no obligation because of his call.

KENNEDY VIBRATING SCREEN



Built in open or enclosed types, in widths ranging from 3′ to 6′ with one or more decks. It can be suspended, or supported from the bottom.

Suitable for scalping oversize from primary crushers, as well as smaller sizes, and chemical products.

The entire screening surface is effective, thereby insuring greatest capacity.

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Screen drive shaft is positioned near the feed end for balancing purposes and is patented.

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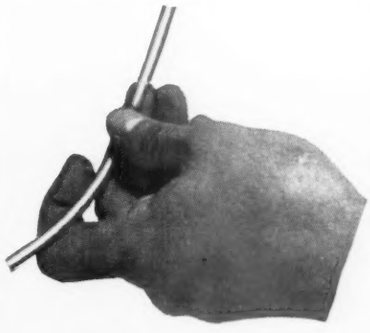
Cordeau is the hook-up *and* detonator combined. It detonates *every* cartridge in the hole. It connects every hole. Thus it insures the *practically* simultaneous detonation of the entire blast.

We say *practically simultaneous* because the detonating wave of Cordeau travels at a speed approximating 3 miles per second. This speed, fast as it is, nevertheless permits a hook-up planned to give shots in rotation and thus relieve burden.

With each shot able to exert its maximum power in fragmentation and removal, you have more work from your explosives — *better blasting.*



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2. Less Hazard
3. More work from your explosives
4. Better fragmentation
5. Fewer but bigger shots (Equipment moved less often)

Write for the Cordeau Book.

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ALSO SAFETY FUSE *Since* 1836

CB-48

THE ENSIGN-BICKFORD COMPANY

SIMSBURY, CONNECTICUT

Classified Buyers' Guide

A Directory of PIT AND QUARRY Advertisers Arranged According to Product

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*American Steel & Wire Co.

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Pulleys (Wing)
Sprout, Waldron & Co.

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*Hardinge Co.
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Universal Road Machy. Co.

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*American Pulverizer Co.
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*Gruendler Crusher & Pulverizer Co.
*Hardinge Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
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New Holland Machine Co.
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*Allen-Sherman-Hoff Co.
*Morris Machine Works

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*Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
Hetherington & Berner, Inc.
Kansas City Hay Press Co.
*Morris Machine Works

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*Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
Hetherington & Berner, Inc.
*Morris Machine Works

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*Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
Hetherington & Berner, Inc.
Kansas City Hay Press Co.
*Morris Machine Works

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Chicago Pneumatic Tool Co.

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*Pioneer Gravel Equipment Mfg. Co.
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*Link-Belt Co.
*Pioneer Gravel Equipment Mfg. Co.
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*Deister Machine Co.
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*Pioneer Gravel Equipment Mfg. Co.
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*Robins Conveying Belt Co.
*Roebling's Sons Co., John A.
Smith Engr. Works
Smith Wire & Iron Works, F. P.
Sprout, Waldron & Co.
Universal Road Machy. Co.
*Wickwire Spencer Steel Co.

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*Allis-Chalmers Mfg. Co.
*Austin-Western Road Machy. Co.
*Deister Concentrator Co.
*Deister Machine Co.
*Gruendler Crusher & Pulverizer Co.
Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
*Link-Belt Co.
McLanahan and Stone Corp.
New Holland Machine Co.
Nordberg Mfg. Co.
*Pioneer Gravel Equipment Mfg. Co.
*Productive Equip. Corp.
*Robins Conveying Belt Co.
Smith Engr. Works
Sprout, Waldron & Co.

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Knickerbocker Co.

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*Allis-Chalmers Mfg. Co.
*Eagle Iron Works
*Gruendler Crusher & Pulverizer Co.
Haiss Mfg. Co., Geo.
Hetherington & Berner, Inc.
*Link-Belt Co.
*Jeffrey Mfg. Co.
McLanahan and Stone Corp.
Sprout, Waldron & Co.

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*Austin-Western Road Machy. Co.
*Harnischfeger Corp.
*Lima Locomotive Works, Inc.
*Link-Belt Co.

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*Allis-Chalmers Mfg. Co.
Hetherington & Berner, Inc.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.

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*Link-Belt Co.

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*Deister Concentrator Co.

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Iowa Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Sprout, Waldron & Co.

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*Jeffrey Mfg. Co.

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Smith Wire & Iron Works, F. P.

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Ryerson & Son, Joseph T.

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Ryerson & Son, Joseph T.

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*Hendrick Mfg. Co.
Hetherington & Berner, Inc.
Manganese Steel Forge Co.
Sprout, Waldron & Co.

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*Jeffrey Mfg. Co.
*Link-Belt Co.
*Sauerman Bros., Inc.

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*Allen-Sherman-Hoff Co.

Tanks
*Hendrick Mfg. Co.
*Link-Belt Co.

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*** See also information in the 1935 Pit and Quarry HANDBOOK.**

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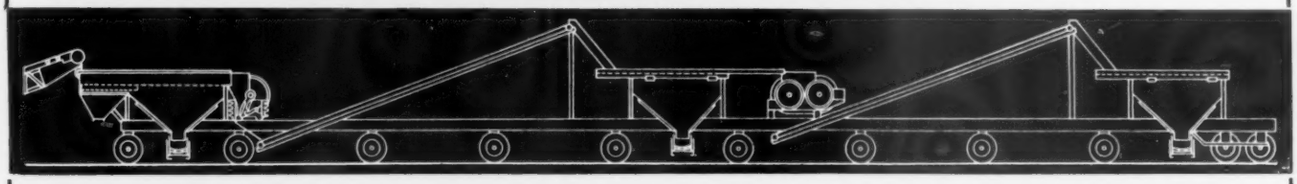

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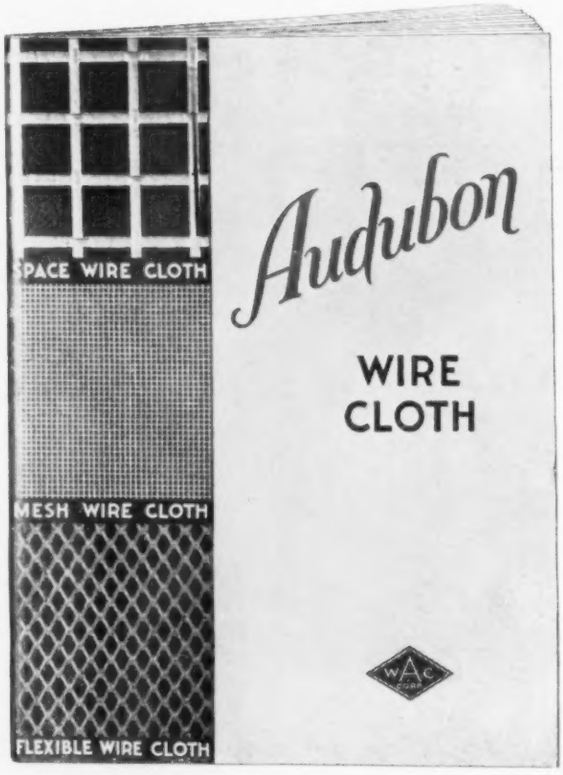

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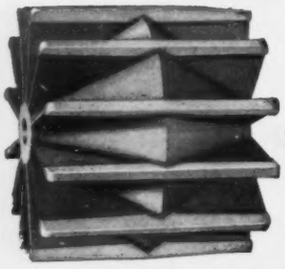

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- ☐ Bags, cloth
- ☐ Bags, paper
- ☐ Balls, steel
- ☐ Barges, steel
- ☐ Belt Dressing
- ☐ Belt fasteners
- ☐ Belting, conveyor and elevator
- ☐ Belting, transmission
- ☐ Belt lacing
- ☐ Belt plates
- ☐ Belt rivets
- ☐ Belt tighteners
- ☐ Bin gates
- ☐ Bins, concrete
- ☐ Bins, steel
- ☐ Blasting supplies
- ☐ Blasting powder
- ☐ Blocks, friction
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- ☐ Bodies, Motor Trucks
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- ☐ Buckets, Conveyor and Elevator
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- ☐ Carriers, Belt
- ☐ Cars, Dump
- ☐ Cars, Kiln
- ☐ Castings, Manganese Steel
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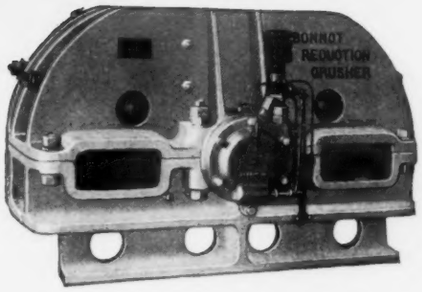

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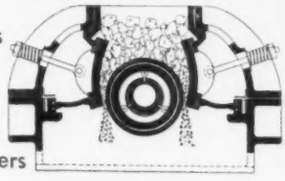

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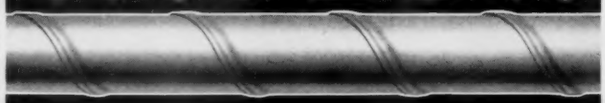

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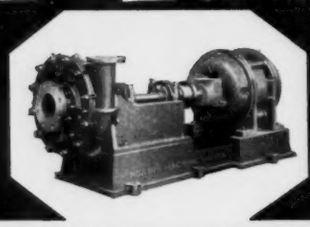

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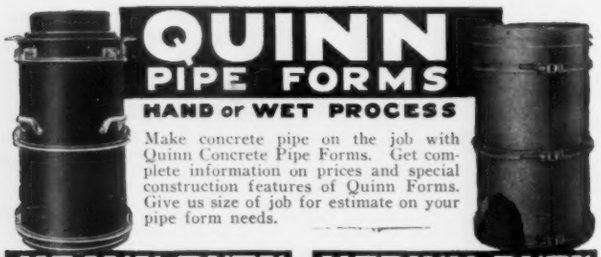

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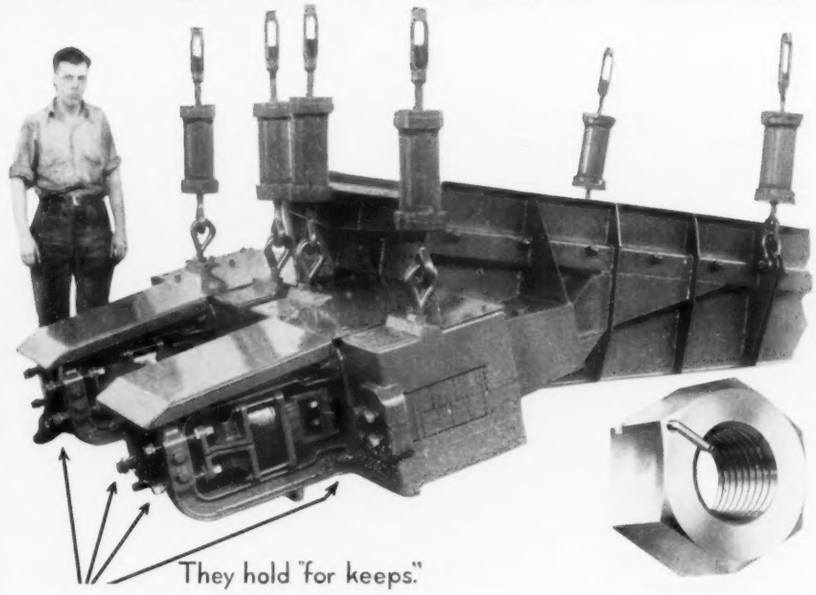

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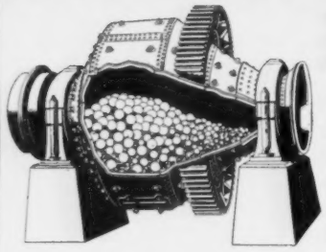

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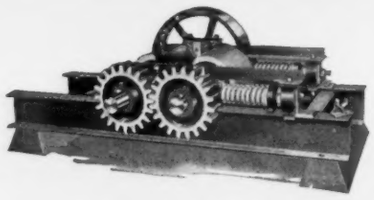

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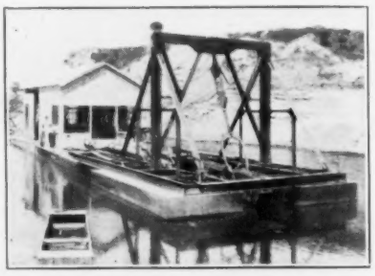

Will eliminate stoppages and slug pumping — insuring an even, constant feed of solids to the suction nozzle — with less power — greatly decreasing the cost per yard of material produced.

Write for descriptive literature and let us tell you how this can be done with your dredge.

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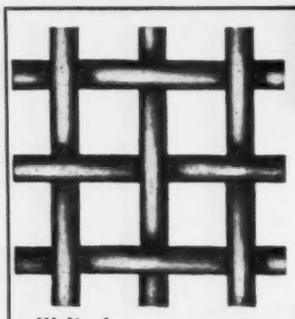
SHOVELS-CRANES-CLAMSHELLS-DRAGLINES
3-4 yd., 1 yd., 1 1-4 yd., 1 1-2 yd., 1 3-4 yd. & 2 yd.
(A TYPE AND SIZE FOR EVERY JOB)

Lima Locomotive Works, Incorporated
SHOVEL AND CRANE DIVISION
Lima, Ohio, U. S. A.

SYMONS
VIBRATING SCREENS
and
CONE CRUSHERS

Especially adapted for producing better crushed and graded materials in greater capacity at less cost.

NORDBERG MFG. CO.
MILWAUKEE, WIS.



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BULLETIN No. 110

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We have developed a special SPRING STEEL Wire Cloth that is showing sensational endurance records in screening hard materials. Read about it in our new Bulletin just published—there's proof in performance. Specify DURO for your screen equipment.

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For Long Life of Belting

The clinched teeth of Alligator Steel Belt Lacing compress belt ends firmly, reducing destructive internal friction and ply separation. "Never Lets Go." The most universally used belt lacing on earth. Has great strength. A smooth, durable joint that rocks on a sectional hinge pin. Supplied in steel, "Monel Metal," and alloys in eleven sizes for belts up to 5/8 in. Standard boxes, "Handy Packages," and long lengths. Identify the genuine by the dark green and yellow box. The Alligator and size number are stamped on the lacing.

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..that's why JAEGER TRUCK MIXERS Outsell All Others

Because they offer every facility for the faster delivery of better concrete ("Dual-Mix" action, 1-man chute, dual controls, rapid accurate water tank and patented discharge) Jaeger Truck Mixers get most of the jobs, serve them at lowest cost, and continue to outsell all other makes. Sizes 1 to 5 cubic yards.

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They Recovered a Lost Market

An excess of objectionable material ruled Ducey & Attwood from City and County contracts. A Knickerbocker Soft Stone Eliminator changed all that. Now their material meets specifications . . . *they've recovered a lost market.*

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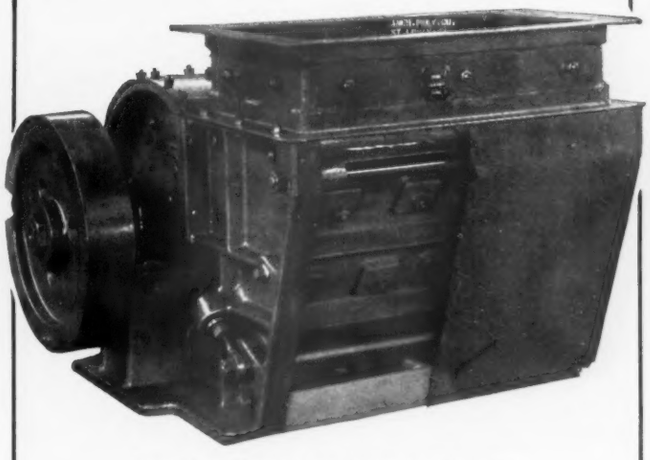
Manufacturers

KNICKERBOCKER Soft Stone Eliminator

AMERICAN *ROLLING RING* CRUSHER



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Unique principle of hydrosealing both sides of the impeller against abrasive wear, cuts maintenance to a fraction and saves ⅓ in power costs in pumping sand, gravel, rock and other abrasive materials—Estimated economies guaranteed. Sizes 2" to 22", pulley or motor drive. Descriptive Catalog sent on request

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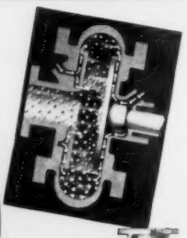

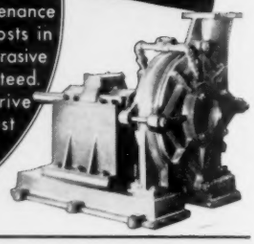

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CEDAR RAPIDS - SYMONS SCREENS

More Efficient
Greater Yardage
Larger Profits
Made in a Complete Range of Sizes

FOR ALL PORTABLE ROCK, SAND OR GRAVEL PLANTS
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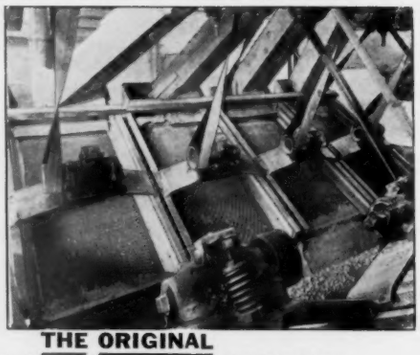
SCREENS—*GUARANTEED SERVICE*



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LEADERS SINCE 1835

CRUSHERS—Double roll and Sledge Wedge Crushers, for practically any product. Capacities to 1000 tons an hour.

SUPER DRY PANS—For especially large tonnages.

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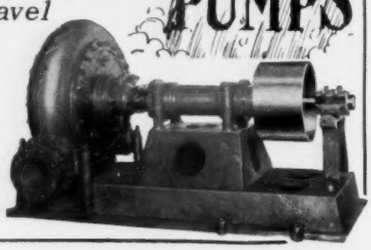
High efficiency — low operating cost—precision workmanship — wear-resisting, non-heating bearings even when operated under extremely high heads. WRITE



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Breakfast, 40c to 75c Luncheon, 85c
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P&H HAS SPEEDED UP *the* DIGGING CYCLE

FOR A BIGGER DAY'S WORK WITH P&H ELECTRIC DRIVE

Abundant horsepower . . . faster swinging balanced machinery units on the main working frame . . . less counterweight . . . these are some of the reasons why P&H Ward Leonards are big producers. In speeding up the swing as high as 3½ R.P.M., P&H engineers have licked the real problem of faster digging. Remember that the swing absorbs nearly 67% of the digging cycle. . . . If you've got a big job in dirt or rock, we will present some facts that will interest you. Better investigate these P&H Ward Leonards. Their modern design does things to handling costs.

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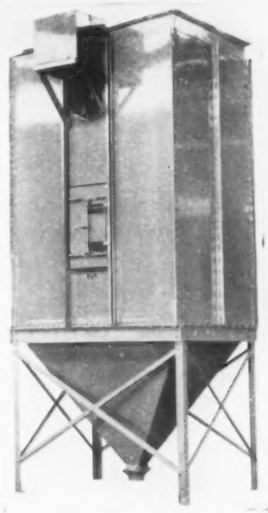
The New DRACCO MULTI-BAG FILTER was especially designed for your plant by engineers with many years of Dust Control experience. It is an economical unit in every way:—low initial cost; very economical to operate; little maintenance required. With 20 years Dust Control experience to draw from we are able to give you the very most for your money. Write for details.



The NEW DRACCO MULTI-BAG FILTER

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Successors to The Dust Recovering & Conveying Co.

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Buy "A Haiss"

BECAUSE it is the most successful, most satisfactory and most profitable—which fact you can confirm from users, and reason out from reading the Haiss catalogs. Four Standard Haiss Loaders—1 to 5 yds. per minute.

Ask for catalogs

George Haiss Manufacturing Co., Inc.

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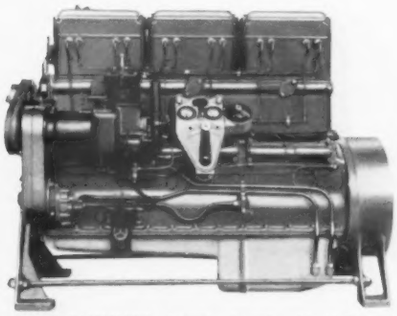
Builders also of HAISS ELEVATORS—SCREENS—CLAMSHELL BUCKETS



Model "HI" CUMMINS Diesel—6 cyl., 85 H.P.—will replace gasoline power in many pit and quarry jobs

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The Ideal Power for Crushers, Shovels, Compressors, Pumps, Etc.

Wherever you now use gasoline engines—for stationary, portable and automotive equipment—CUMMINS Diesel Engines will do a BETTER job at a BIG saving in cost. These modern, efficient Diesels have the "backbone" for the toughest heavy-duty service. Write for full information.

CUMMINS ENGINE CO., COLUMBUS, IND.

The Leader in Diesel Engineering Advancement

SALES AND SERVICE FROM COAST TO COAST

A CUSTOMER SAYS

(Of PLAT-O Vibrating Screens)

"July, 1930, we purchased from you a Type 246 PLAT-O or Double Deck Vibratory Sand Screen, size 4′x6′, serial No. 124. We have this particular unit in operation along side of two other Vibratory Screens of another make and found your own screen so satisfactory that we believe it would be good economy, because of the low up-keep in cost, to consider the installation of another such unit in place of the other two units."

We will, upon request, furnish you the name of this customer and location of his PLAT-O Screen so you may investigate for yourself and profit by his experience.

Write for descriptive Bulletin No. 22

DEISTER MACHINE COMPANY

1933 East Wayne Street **Fort Wayne, Indiana**

READ BEFORE YOU SPECIFY

Get this Book listing the 40 Sizes of

DIXIE MOGUL

Non-Clogging Hammermill

Tough crushing is "easy meat" for the DIXIE. That irresistible moving breaker plate—26 times the average area—stops at nothing! That is why DIXIE is so economical in production—it never takes a day off for shutdowns. You can depend on DIXIE for uninterrupted operation—and rock-bottom crushing costs.

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BIN-DICATOR

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THE EYES OF THE BIN!

AUTOMATIC INDICATION and CONTROL OF BULK MATERIALS IN BINS AT LOW COST

The Last Word in Plant Efficiency!

WRITE FOR COMPLETE INFORMATION

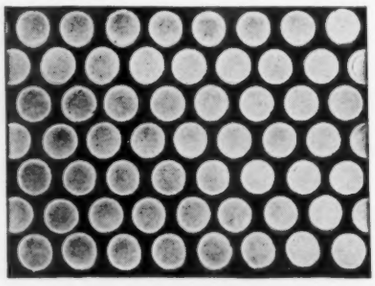
(RELIABLE AGENTS WANTED)

MANUFACTURED BY

RIPLEY MANUFACTURING CO.

WAYNE, MICH.

MORROW SCREEN PLATES



MORROW PERFORATED METAL SCREEN PLATES for sizing and preparing coal, sand, gravel, stone and other bulk materials are made by a Company specializing in screening machinery.

A complete set of punches and dies covering a wide range of sizes, in round, square, oval and diagonal slots are ready for the press, insuring prompt delivery of orders.

The Morrow Manufacturing Co.

Wellston, Ohio

Equipment for Sale Cheap

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1—Baldwin 75 ton 6 wheel switcher Oil burner.
1—Marion 1 yd. Steam crane 40′ boom, on cats.
1—Marion 15 ton gas crane 40′ boom.
1—Link-Belt K-2 crane 50′ boom 15 ton capacity.
1—Link-Belt K-44 crane 50′ boom.
1—Browning ⅝ yd. shovel 35′ crane boom.
1—Lorain 75 A 1¼ yd. chain crowd shovel.
1—Universal 7½ ton truck crane.
1—Lambert 3 drum hoist with Swinger Buda gas eng.
1—80 HP. Pennsylvania loco. type boiler.
1—Caterpillar with bulldozer.
1—Monarch 75 Caterpillar with bulldozer.
1—Sullivan 310′ portable compressor.
1—Chicago Pneumatic 220′ portable compressor.
2—Ingersoll-Rand 220′ portable compressors.
1—Ingersoll-Rand pavement breaker.
6—2 wheel concrete buckets.
1—Ransome 27 E paver.
1—7 E Koehring paver self propelling.
2—1 yd. Insley bottom dump concrete buckets.
1—1 yd. Steubner bottom dump concrete bucket.
1—1 yd. Blaw-Knox clamshell bucket.
1—1 yd. Kiesler rehandling bucket.
1—¼ yd. Hayward orange peel bucket.
1—¾ yd. Browning clamshell bucket.
1—⅝ yd. Owen digging bucket.
1—¾ yd. Blaw-Knox bucket.
1—Morris 8″ dredge pump 150 HP. GE. mtr.
1—Morris 10″ cent. pump 2250 GPM @ 130′ head.
1—Goulds 12″ cent. pump 50 HP. GE. motor.
1—Thompson 6″ self priming pump Waukesha mtr.
4—Humdinger 6″ self priming pumps gas motor.
2—Domestic 4″ self priming pumps.
1—GE motor 200 HP. slipring.
1—# 7 McKiernan-Terry hammer.
1—# 5 McKiernan-Terry hammer.

HARRY C. LEWIS, 325 Frelinghuysen Ave., Newark, N. J

Tunnel Contractor's Plant

2—Ottumwa heavy duty mine hoists, rigid drum 48″ dia., 48″ face, 6″ flange, grooved for 1″ rope, 10,000 lb. hoisting duty; 100 hp., 3 phase, 60 cycle, 440 volt G. E. slip ring motor, reversing controller, post brake and thrustor emergency brake, dial indicator.
2—110 C.F.M. gas portable compressors.
4—640 and 1—750 C.F.M. Class WJ3 Sullivan compressors.
1—Symons 3-ft. crusher.
1—24x36 Worthington crusher.
2—12″ Traylor crushers.
1—D. C. D.D. 7x10 steam hoist.
3—100 hp. Lidgerwood dragline hoists, electric.
1—50 hp. Sullivan dragline hoist.
Concrete mixers, centrifugal pumps, motor trucks, air receivers, gas and electric locomotives.

Priced for quick sale.

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Gilbertville, Mass.

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10 and 35 Ton All Steel Stiff Leg Derricks.
No. 75 Dayton Steam Whirley.
1½ Yd. Bucyrus Electric Shovel.
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Nos. 30 and 42 American Ring Roll Crushers.
No. 2 Williams Semi-Vulcanite Hammer Mill.
No. 1 Williams Duplex Pony Crusher.
No. 9 Gates K Gyratory.
2—3x6 S-A Double Deck Vibrators.
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678′ I-R, type XRB Compressor.
2—118 Foot Gardner XH Compressors.
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18″, 24″, 36″ Elevators.
8 Ton Tandem 4-Cyl. Gasoline Roller.
12″ Amsco Pump, Belted.
All the above actually on hand, in good condition, ready immediate shipment.
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LOCOMOTIVES STANDARD GAUGE

3—72-ton American 6-wheel Switcher with separate tenders.
1—50-ton Davenport 6-wheel Switcher with separate tender.
2—50-ton American 4-wheel saddle tanks.
4—40-ton American 4-wheel saddle tanks.
2—36-ton Porter 4-wheel saddle tanks.
2—33-ton Vulcan 4-wheel saddle tanks.
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Birmingham, Alabama

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2 Bucyrus 2 yd. Diesel Draglines.
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1¼ yd. Thew Steam Shovel.
1 Caterpillar 75 Diesel Tractor.
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14 ton Whitcomb Std. Ga. Gas Locomotive.
60 HP Portable Firebox Boiler.
750-1250-1800 yd. Asphalt Plants.
Rotex 48x72, No. 18, 2 Deck Screen.
Rotex 36x84, No. 6R, 1 Deck Screen.
Traylor 36x16 Sand Rolls.
Champion 1030 and 1040 Roller Bearing Jaw Crushers.
Acme 18x11 Model 9½D Jaw Crusher.
Worthington 36x24 Jaw Crusher.
Allis Chalmers 48x36 Jaw Crusher.
3 ft., 5½ ft., 7 ft. Symons Cone Crushers.
18 in. and 24 in. Symons Disc Crushers.
No. 0 Raymond Lime Pulverizer.
6 ft. by 8 ft. Traylor, Tube Mill.
Bonnot No. 4 Tube Mill 4x22.
Pennsylvania SX4 and SX6 Pulverizers.
400 KW Busch Sulzer Diesel Generator.
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Portable Air Compressors: 110-220 & 320′ cap.
Orange Peel Buckets: 5 ft. to 48 ft. cap.
1730 ft. Chicago Pneumatic Elec. Air Comp.
4x5 and 4x7 Hummer Vibrating Screens.

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2—Dings No. 2 Magnetic Separators
2—No. 57 Fuller Lehigh Mills
1—A-C Gates 4K Gyr. Crusher, 8x30
2—Penn S-7 Hammer Crushers, 36x16
1—A-C McCully Crusher, 10x52
1—Goodman No. 48 u/g elec. Shovel
1—25-T Loco. Crane 50′ & 75′ booms
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3—1½-yd. Brown Ore Buckets
2—0-6-0 50-ton Baldwin Locos.
20 & 30-yd. Dump Cars
50-ton Gondola and Hopper Cars.

All Types of Crushers and Equipment.

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Jaw Crushers—2″x4″ up to 66″x84″.
Crushing Rolls—12″x12″ up to 54″x64″—Gyratory Crushers.
Ring Roll Mills—No. 0 and No. 1—Swing Hammer Mills.
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Rebuilt Air Compressors.
Complete drying and asphalt mixing plants.

W. P. HEINEKEN
95 Liberty St., N. Y. Tel.: Barclay 7-7298

FOR SALE

Gyratory Crushers: No. 6, No. 5 and 10″ Superior McCully, No. 5 Austin, No. 4 Style N, No. 3 and No. 2 Gates.
Symons Horizontal Disc Crushers: 48″ and 24″.
Jaw Crusher: 6x14, 8x16, 10x20, 16x24, 8x36, 11x36, 24x36.
Gas and Electric Motors: 1 HP to 200 HP.
Hoists: Clyde 2 drum for 2 yd. drag scraper, Thomas 2 drum for 1½ yd. drag scraper, several smaller.
Insley 5 ton all steel derrick, 80′ boom, 90′ mast, 2—55′ guy struts, 16′ bull wheel. 7x10 three drum hoist engine. 3x4 swing engine.

4 Complete gravel washing plants.

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MOTORS—3 PH., 60 CY.

Hp.	Type	Speed
2850	G. E. Syn.	450
675	Al. Ch. Syn.	900
600	G. E. Syn.	257
600	G. E. sl. rg.	257
600	G. E. sl. rg.	720
400	West. sl. rg.	514
300	G. E. sl. rg.	585
260	Al. Ch. Syn.	720
250	F. M. sl. rg.	1200
200	West. sl. rg.	900
200	G. E. sl. rg.	900
150	G. E. sl. rg.	1750
150	West. sl. rg.	720
100	G. E. sl. rg.	570
100	West. sl. rg.	1160
75	G. E. sl. rg.	1200
60	G. E. sl. rg.	900

ENGINE GENER.
1—400 kva., Cr. Wh., 240 v., 3 ph., 60 cy., 120 r.p.m. to Hamilton Corliss Engine.

MOTOR GENER.
1—500 kw. G.E.D.C.Gen. 250/275 v. Comp'd, Interpole, 720 r.p.m., cpld. to 700 hp. G.E. type ATI, Syn. Motor, 2200/440 v., 3 ph. 60 cy., 720 r.p.m.

CENTRIF. PUMPS
3—14,000 G.P.M., 150′ Head dir. conn., 675 hp. Al. Ch. 900 r.p.m. syn. motors.
1—14,000 G.P.M., 60′ Hd., dir. conn. 260 hp., Al. Ch. 720 r.p.m.

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153 W. 18TH ST., NEW YORK CITY
REBUILT GUARANTEED

MISCELLANEOUS BARGAINS

Reduction Crushers—Newhouse No. 7, McCully 6″, Cones to 7′. Rolls 16x10 to 60x36.
Gyratory & Jaw Types—3″ to 40″. & 6x8 to 66x84.
No. 4 Williams Jumbo Hammermill. A-1.
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Diesel-Electric Drag., 3½-4 yd., 115-100′ boom.
¾ yd. Has Cat. Drag., 50′ boom. Good. $1250.
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Haiss Loader—Real buy. Also Barber-Greenes.
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1 Yd. Sauerman D-8 Outfit, electric. Would convert to gas, or Diesel if desired.
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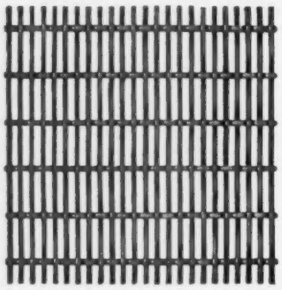

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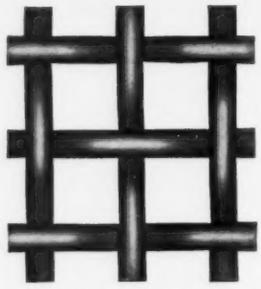

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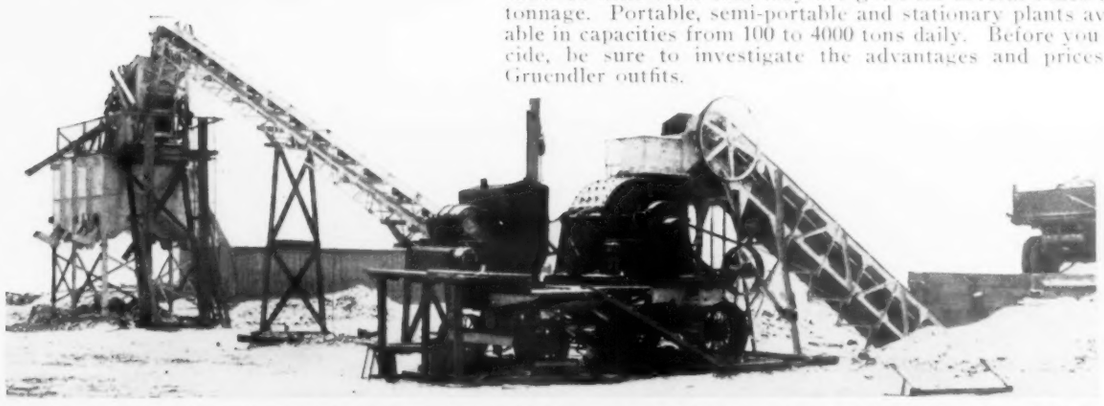

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Here is what users say

"Our 400 H.P. Buckeye Diesel saves $6000.00 per year over former steam power cost."

"The 262½ H.P. Buckeye furnishes power equally as satisfactory as purchased current. Power Cost reduced 55%."

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Write for Bulletin G. It describes the Buckeye Savings Purchase Plan.

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LAY·SET* *Preformed* Wire Rope

* PREFORMED ROPE IS MADE IN ALL TYPES, GRADES, CONSTRUCTIONS AND LAYS